

This Week in The Iron Age

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Editorial

Making America Strong 31

Technical Articles

Industrial Controlled Atmospheres 33
X-Raying Airplane Parts Automatically 39
Tri-Clad and New Motor Sizes Announced 40
Salt Bath Heating for Forging 42
Making Carbide Tools 43
Stainless Steel Deep Drawing and Spinning 47
Reinforcing Bar Bending Machine 53
Hydraulic Press Opens New Plant at Mt. Gilead 54

Feature Reports

On the Assembly Line 60
Washington News 64

News and Market Reports

News of Industry 70	Machine Tool Activity 114
Personals 100	Non-Ferrous Market 115
Obituaries 102	Scrap Market and Prices 116
Metal Working Activity 103	Construction Steel 118
Comparison of Prices 104	Iron and Steel Prices 120
Summary of the Week 105	Ferroalloys, Pig Iron Prices 125
The Industrial Pace 106	Warehouse Prices 126
District Market Reports 108	Sales Possibilities 128

Fatigue Cracks 68
Free Industrial Literature 71
Products Advertised 141
Index to Advertisers 174

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The Iron Age

NOV. 21, 1940

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1855



Making America Strong

YOU cannot sharpen a chisel, an axe or a sword without submitting it to the punishing action of an abrasive. By the same token, you cannot refine National ideals or ideas unless you submit them to the grindstone of criticism or the crucible of courageous and sincere opposition.

In line with this general thought, it seems to me that the unsuccessful opposition, in the late political campaign, has indeed been eminently successful in teaching America one outstanding truth. It is this: "Only the productive can be strong, and only the strong can be free."

If we, regardless of party or political ancestry, can absorb this truth and resolve to act upon it, the battle of 1940 will not have been fought in vain.

Many of us had more or less forgotten this truth in the abnormal years of the last decade. Many of us have become accustomed to "thumbing rides" in the endeavor to get the most for the least in the scramble, to the tune of "devil take the hindmost." We had forgotten that when the devil catches up with the tail end of the procession, it is not long before he works his way to the front of it.

"Only the productive can be strong." If we look back through history, how often can we find that truth set forth, and exemplified. The parable of the fig tree and of the buried talents; the example of Mother Nature in the fructification of the animal and the vegetable kingdoms; all of these emphasize the essential law of survival—productivity.

In our own cherished land of freedom, productivity has been the keynote of our outstanding progress. More goods for more people. What if at times we have produced more of this or that than we could for the time consume. Are not surplusses better than deficits? We can find ways to deal with too much. But show me the man who can find the way to do with too little.

"Only the productive can be strong." And we need a strong America. We need, with our shorter working hours, a larger productivity per man for the products of both peace and war than that of Germany or Italy or Japan and their satellite nations. And all energies today, regardless of political belief, are bent in the direction of attaining it. Attaining it to keep us free for "only the strong can be free."

Productivity. That is the challenge facing every American today, whether he be captain of industry or rawest recruit in our labor ranks.

And put to the test, what does this mean? It means that each and every one of us must apply ourselves more diligently; that each of us must strive every day to produce a little more and a little better than we have done previously, to the end that America can and shall become strong and therefore remain free.

Let's get about it.

J. H. H. H. H. H.

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**Bevin Urges Cut
in Factory Hours**
WORKERS FEELING STRAIN OF
PRESENT LONG SPELLS

By IAN MACKAY
MILLIONS of war workers who for the last three
months have been working a seven-day 70- to
80-hour week are to have their hours
reduced.

Extract from "News Chronicle" of July 30th, 1940

Industrial Controlled Atmospheres

By NORBERT K. KOEBEL

THIS is the first section of a four-part article describing industrial controlled atmospheres and methods for heat treating high carbon, tool and alloy steels decarburization-free and bright. Herein, attention is directed specifically to determining the efficiency of a controlled atmosphere, and the air-gas ratio method of controlled atmospheres.

o o o

THE heat treatment of high carbon and tool steels in controlled atmospheres is not entirely new. However, the perfection in atmosphere control methods and furnace design to bright or scale-free harden such steels free from decarburization or carburization is a recent new development that has taken place in the last few years. Atmosphere control, or protective heat treating, has been used to some degree or another as long as tools and high carbon spring parts have been made and hardened.

The old timers through practical experience learned that the adjustment of the flame in a gas-fired furnace had an important bearing on the surface condition both from the point of view of hardness and scale. They soon learned to their disappointment, however, that as more new alloys were developed this method of atmosphere control became more limited and more of a detriment than a benefit. To overcome this difficulty, methods of pack hardening in a carbonaceous material or cast iron chips or coating the tool with borax or some other protective film were devised, but these methods were messy, makeshift, and not entirely satisfactory for all tool steels and impracticable for production hardening of high carbon steel parts. Such methods, however, were probably highly suggestive to later successful developments of the carbonaceous muffle block and salt bath methods for heat treating high speed, tool steels.

After the development of the electric furnace, its use and successful application to the hardening of high-carbon and tool steels depended entirely upon a gaseous atmosphere to prevent oxidation and decarburization. To

meet this end, the same principle that the practical heat treaters found to work on the opened, gas-fired furnace was applied. A ratio of city or natural gas and air was burnt and the products of combustion were passed into the furnace chamber. Inasmuch as the heat of combustion of the fuel gas was not needed, a wider range of different gases in the products of combustion could be obtained by using various gas-air ratio settings. Although this development proved to be a valuable contribution to protective hardening, oxidation and decarburization were not entirely eliminated, but were greatly reduced on many types of steels that could not be handled in the opened, gas-fired furnace. This atmosphere was not, however, beneficial to all tool steels. The high-carbon high-chromium types, for example, could not be heat treated without excessive scale and decarburization, and the method of pack hardening still had to be resorted to.

The demands for the use of the high carbon high chromium steels grew to such an extent that a more efficient method than pack hardening for protective heat treating was neces-

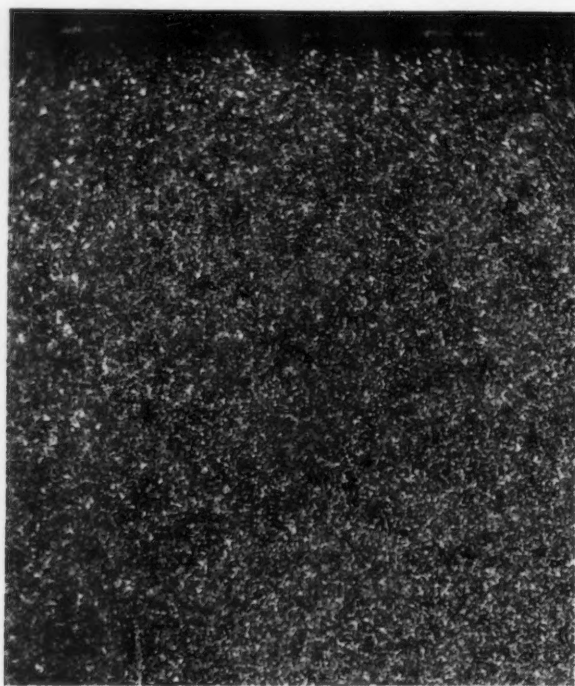


FIG. 1—A straight high-carbon tool steel hardened at 1450 deg. F. in a 2.7 per cent O_2 —8.3 CO_2 —17.0 H_2O —72.0 N_2 atmosphere for 2 hr. and water quenched. Shows no visual decarburization. Magnification 100 diameters. Nital etchant. Drawn to 700 deg. F. Rockwell hardness as quenched 66-67C.

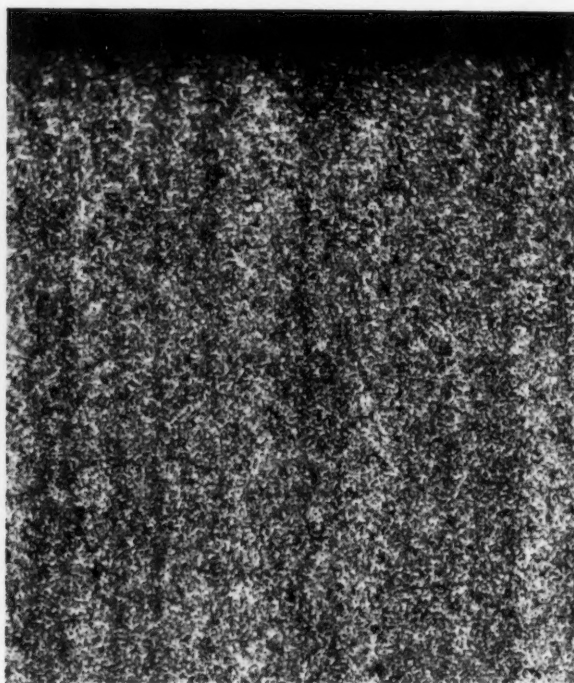


FIG. 2—Manganese non-deforming tool steel hardened at 1450 deg. F. in a 2.7 per cent O_2 —8.3 CO_2 —17.0 H_2O —72 N_2 atmosphere for 2 hr. and oil quenched. Shows no visual decarburization. Magnification 100 diameters. Nital etchant. Drawn to 700 deg. F. Rockwell hardness as quenched 64-64.5C.

sary. The method of producing a protective atmosphere by cracking a liquid hydrocarbon was devised and found satisfactory for scale-free, decarb-free hardening of the high carbon-high chromium steels. This method and the gas-air ratio method became the standard methods of atmosphere control for high carbon and tool steels. Because of the complexity of the problem and the lack of information and knowledge on the gas-steel reactions, further developments were not made for quite a few years to come.

The developments of bright annealing of low-carbon sheet and strip and bright brazing made metallurgists, heat treaters, and tool and production men even more atmosphere conscious and desirous to bright harden high carbon

and tool steels in order to take advantage of the savings in cleaning, pickling, and grinding costs. The atmospheres used for bright annealing low-carbon strip and bright brazing were found to be excessively decarburizing to high carbon or alloy tool steels. Research work on controlled atmospheres and studies on the gas-steel reactions were made by Gillett,¹ Koebel,² and Slowter and Gonser.³ These studies pointed out the types of gases and gas mixtures that must be avoided, the type or types of gas mixtures that would be needed, and the complexity of the problem in obtaining such gases economically. Further research and development work were soon carried out by several progressive furnace manufacturers, and bright or scale-free hardening of high-carbon and tool steels free from decarburization or carburization soon became a reality instead of a dream.

Inasmuch as the recent new developments constitute only about 10 per cent of the controlled atmosphere equipment now used in industry for heat treating high carbon and tool

steels, the older methods will first be discussed in order to show what steels these methods are best suited for, the limitations of the equipment, and the advantages and savings one might expect in replacing this equipment with the recent new developments.

Efficiency of an Atmosphere

Perhaps the most logical thing to do before discussing and comparing the efficiencies of controlled atmospheres is to discuss the various methods used for testing and evaluating an atmosphere. The methods that have been used for determining decarburization or carburization are as follows:

- (1) Hardness test.
- (2) Photomicrograph.
- (3) Analysis of consecutive cuts.
- (4) Change in weight.

HARDNESS TEST: The hardness test is the most commonly used method to check for decarburization or carburization chiefly because first, almost everyone associates decarburization with softness or carburization with hardness; second, the hardness test is the easiest to make; and third, prac-

¹ "Controlled Atmospheres in Steel Treating," H. W. Gillett, Metals and Alloys, Vol. 6, August, 1935; September, 1935; October, 1935, and November, 1935.

² "Controlled Atmospheres in Heat Treating Steels, N. K. Koebel, thesis for M.S. in metallurgical engineering, Ohio State University, 1936.

³ "Grain Size and Its Influence on Surface Decarburization of Steel," by D. H. Rowland and C. Upthegrove, A.S.M. convention, Chicago, Sept. 30, 1935.

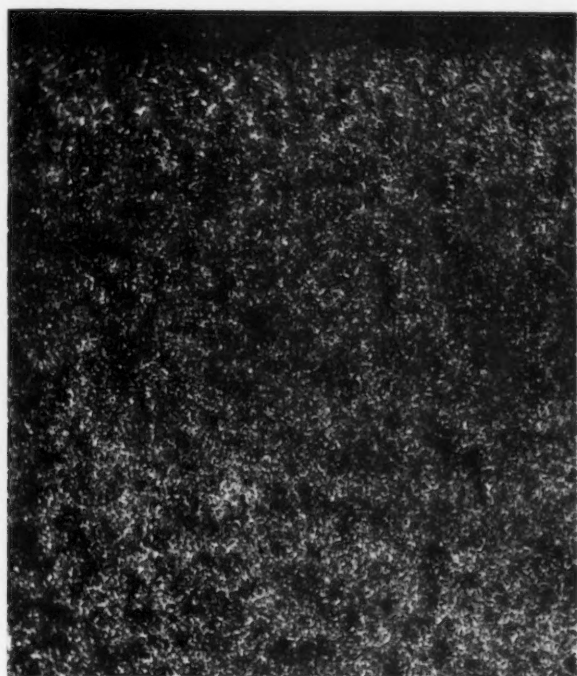


FIG. 3—Silicon-manganese tool steel hardened at 1550 deg. F. in a 2.7 per cent O_2 —8.3 CO_2 —17.0 H_2O —72 N_2 atmosphere for 2 hr. and water quenched. Shows slight decarburization. Magnification 100 diameters. Nital etchant. Drawn to 700 deg. F. Rockwell hardness as quenched 59-62C.

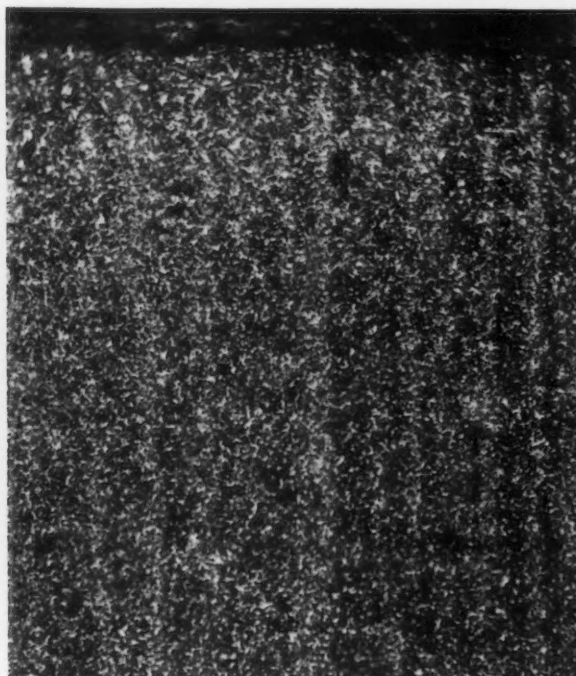


FIG. 4—Tungsten chisel tool steel hardened at 1750 deg. F. in a 2.7 per cent O_2 —8.3 CO_2 —17 H_2O —72 N_2 atmosphere for 2 hr. and oil quenched. Shows only slight decarburization, but steel was actually badly decarburized. Magnification 100 diameters. Nital etchant. Drawn to 700 deg. F. Rockwell hardness as quenched 40-41C.

tically all heat treating departments have a means for making this test. The hardness test is, however, the least scientific and the least accurate of the four methods listed. In the first place, this test does not give quantitative data for plotting the results to compare one atmosphere with another, and in the second place other factors, such as quenching rate and temperature have a bearing on the hardness of the steel, and unless the steel is definitely decarburized, there is always doubt as to the real cause of a low value, especially when the hardness reading is only a point or two below the maximum hardness value expected.

The author has found that it is very possible for a steel to become decarburized to an extent to influence the wear resistance, but not to an extent to show up on the hardness tester. This can happen on high carbon steels when the rate of diffusion of carbon from the core to the surface of the steel keeps apace or nearly apace with the rate of decarburization, or loss of carbon, from the surface of the steel to the atmosphere. In this case, the sur-

face does not become totally decarburized and although an appreciable amount of carbon has been lost at the surface, there is still enough present to give a high reading on the hardness tester. For example, the surface of a high carbon-high chromium steel of the 2 per cent carbon, 12 per cent chromium type may be decarburized down to a 1.5 per cent carbon type and still be capable of obtaining the maximum hardness as expected from the 2.5 per cent C steel. Likewise, a water-hardening or an oil-hardening tool steel having a carbon content of 1.2 per cent may be decarburized down to 0.80 or 0.90 per cent and still obtain a hardness reading equivalent to the maximum value of the 1.2 per cent carbon steel. One should remember that the Rockwell or any other hardness tester gives a relative figure indicating the hardness of the steel tested and that this figure does not indicate the wear resistance.

The hardness test may be thought of and used as a rough, qualitative field test. Such a simple check and test on an atmosphere comes in very handy in

setting up and making a preliminary adjustment in generator atmosphere equipment and atmosphere furnaces. When the point is reached where no difference can be determined in the hardness value, then a more sensitive and accurate test can be made. A good procedure to use in checking for decarburization or carburization by means of a hardener tester is to use a Rockwell superficial tester as well as the standard Rockwell tester. Then by means of a conversion table, the value or values obtained by various weights on the superficial tester are transposed to the Rockwell C scale. These values are compared with the value obtained from the standard Rockwell tester using the C scale. A lower transposed C reading indicates decarburization while a high C transposed reading indicates carburization. This method makes the hardness test somewhat more accurate by eliminating the doubt and guesswork on specimens that are only a point or two over or under the maximum hardness value of the steel. The use of two machines does not, however, make the method

foolproof to the cases where decarburization or carburization may take place to such a degree as not to affect the hardness of the steel.

PHOTOMICROGRAPH: The method of checking decarburization or carburization by the microscope has the advantage of giving one a picture of what has taken place. This method does not, however, always give a true picture or show the total amount or total depth of decarburization. The free-ferrite layer which one usually looks for in a decarburized steel may be only a small percentage of the total depth of decarburization. On some types of steels, depending on the carbon and alloy content, decarburization that takes place without showing free-ferrite or below that area can be detected readily while on others it is quite difficult or impossible even when the hardened samples are drawn from 600 deg. to 1000 deg. F. to obtain a secondary troostitic or sorbitic structure to show the decarburization or carburization more readily than can be seen on the hardened specimens having an austenitic-martensitic or a martensitic-primary troostitic structure. The best structure for tracing the total depth of decarburization, especially on straight-carbon steels, is that obtained by full annealing, i. e., heating above the AC_3 and cooling very slowly. Obviously this method is only practical in checking the effect of the atmosphere on annealing and not on hardening at various time periods.

The disadvantages in the use of the microscope may be summarized as first, not sensitive enough to check for small amounts or show the total depth of decarburization; and second, does not give data for plotting curves to compare one atmosphere with another; third, requires special equipment; fourth, requires considerable time and technique to prepare the specimen and to photograph the results. On the other hand, the microscope may be used as an alternative method to add further data or to be used in the cases where the accuracy of the other methods fail or cannot be used.

ANALYSIS OF CONSECUTIVE CUTS: The method of checking decarburization or carburization by analyzing consecutive cuts from the diameter of the specimen has been used by D. H. Row-

⁴ Carpenter Steel Co. service bulletin, F. R. Palmer, Vol. 2, Nos. 13, 14, 15 and 16.

⁵ "An Experimental Study of Gases for Controlled Atmospheres in the Heat Treatment of Steel," by E. E. Slowter and B. W. Gonser, Metals and Alloys, June, 1937; also, "Comparative Effects of Controlled Atmospheres on Alloy and Carbon Steels," Metals and Alloys, February and March, 1938.

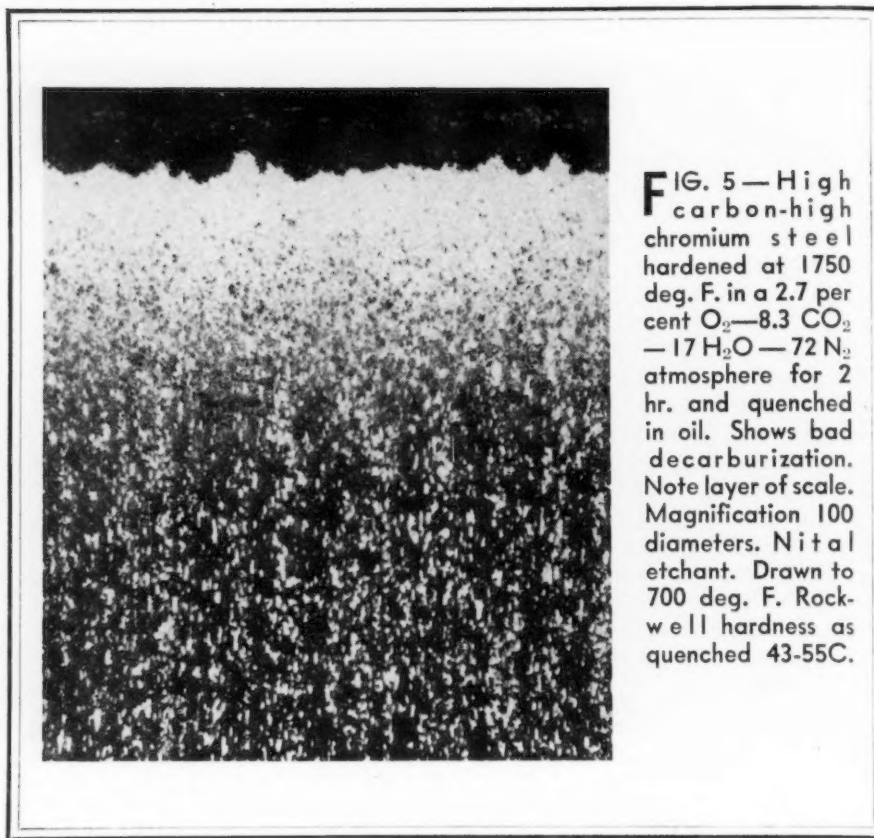


FIG. 5—High carbon-high chromium steel hardened at 1750 deg. F. in a 2.7 per cent O_2 —8.3 CO_2 —17 H_2O —72 N_2 atmosphere for 2 hr. and quenched in oil. Shows bad decarburization. Note layer of scale. Magnification 100 diameters. Nital etchant. Drawn to 700 deg. F. Rockwell hardness as quenched 43-55C.

land and Clair Upthegrove³ and by Palmer⁴ and many others. This method is carried out by using a specimen 6 in. long turned down after normalizing to a diameter of $7/8$ in. or 1 in. so as to remove any decarburization and to provide original centers for concentric turnings. After the specimen has been heat treated in the atmosphere for the desired length of time, consecutive cuts of 0.003 in. are taken and a carbon analysis is made on each turning until the set is reached having the same carbon content as the original specimen. If the specimen is hardened from the atmosphere being tested, it must be annealed in a neutral atmosphere to obtain machinability before the cuts can be made for analyzing.

This method has the advantage of giving a complete picture of what has taken place. It not only shows the total amount of carbon lost or gained, but it also gives the gradient of decarburization or carburization. Such data can be used for plotting various curves to study the efficiency of the atmosphere and compare the results with other atmospheres. Another distinctive advantage of the method is that accurate results can be obtained under conditions that limit the use of the other three methods.

The biggest drawback and disadvantage in the use of the method is the

special equipment, the expense, the labor and the time involved in making the test. Another disadvantage is that hardened specimens must be annealed before concentric cuts can be made. Unless the annealing is carried out in a laboratory furnace using an atmosphere that is definitely known to be neutral, decarburization or carburization will occur and this will introduce an error in the results.

CHANGE IN WEIGHT: The change in weight method was first used by Koebel,² and later by Slowter and Gonser⁵ as a scientific means for determining decarburization or carburization in studies on controlled atmospheres. This test is made by accurately weighing the steel sample in grams to the fourth decimal place (to 0.1 mg.) on a chemical balance. After the sample has been heat treated in the atmosphere to be tested for the desired length of time, it is then reweighed. A loss in weight represents decarburization, while a gain in weight represents carburization. In order that the results may be put on a common basis for the comparison of one sample with another and one atmosphere with another, the change in weight in grams is divided by the total area of the sample in square centimeters. This then gives the loss or gain per square centimeter of steel surface submitted to the atmosphere for test. If the sample is

not scaled or oxidized, the loss in weight is due to a loss in carbon, or decarburization, and a gain in weight is due to a gain in carbon, or carburization. For convenience sake in plotting the results, the loss or gain in weight per square centimeter is multiplied by 100,000 to move the decimal place over so as to obtain a whole number.

The size of the sample should be selected so that its weight will not be too great to affect the sensitivity of the balance. If a round bar is used, $\frac{5}{8}$ to 1 in. diameter by 1 in. length is a convenient size to use for the test. The sample should be machined and polished to remove any decarburization formed in the manufacture of the steel and also to provide a smooth, bright surface to determine the effect of the atmosphere on the reflectivity or brightness of the steel. Care should be taken that the sample is washed with a solvent, such as alcohol, ether, or carbon tetrachloride and thoroughly dried before weighing and reweighing.

The change in weight method for determining decarburization or carburization is extremely accurate and sensitive (more so than any of the

other three methods listed) and is easy and convenient to make if there is a good chemical balance at hand. Obviously this method cannot be applied to the testing of atmospheres that scale or oxidize the steel. The change in weight method is definitely limited to bright or scale-free atmospheres. A stain, temper color, or very light oxidation will not affect the results to any serious or noticeable degree, and this method is safe to use as long as a definite scale or oxidation has not formed. Also caution should be exercised in applying this test to check the decarburizing or carburizing effects of salt baths. Most salt baths dissolve or "wash" away the steel surface, and such a condition would lead to very erroneous results.

The interpretation of the results obtained by the change in weight method is somewhat puzzling to those who are not accustomed to the method or to those who wish to think of decarburization or carburization in terms of depth or hardness. The best way to interpret the results and determine the efficiency of a controlled atmosphere by the change in weight method is to run one set of samples at the proper hardening temperature and at the av-

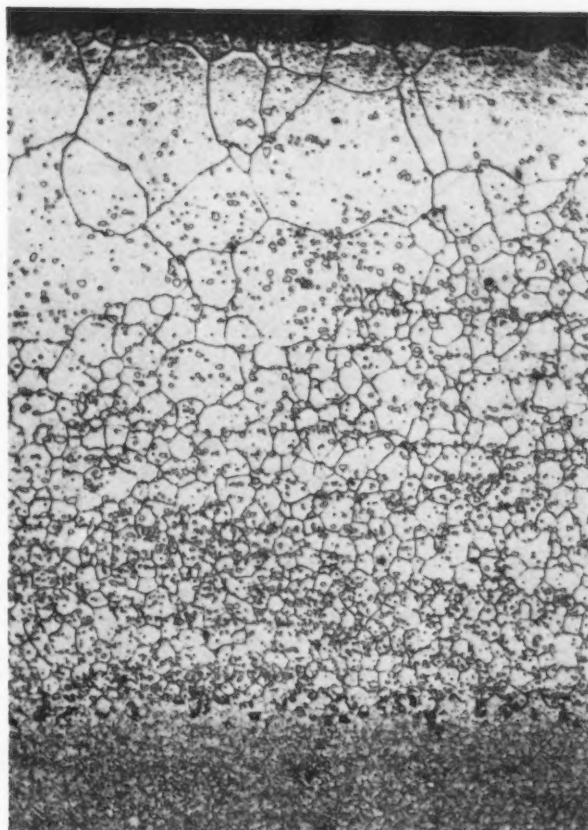
erage time required for heat treating the average run of work made of the steel in the samples being tested; then a second set of samples should be run using the same temperatures as in the first set, but leaving the samples submitted to the atmosphere two to four times as long. The results should be plotted using the change in weight as ordinate and the heat treating time as abscissa. A curve is drawn for each set of samples by connecting the two points. The closer the curve is to the zero, or no change in weight ordinate, the better is the atmosphere for that particular steel. The efficiency of an atmosphere for tool or high-carbon steels is determined by the number of curves that fall very close and also parallel to the zero ordinate or axis. The theoretical allowable limit for any steel may be set at ± 0.00020 gm. per sq. cm. change in weight. This limit has been established by making many tests on various types of steels and rechecking these by the other methods. A -0.00020 gm. per sq. cm. is too small to detect by the use of the microscope on any type of steel.

The practical allowable limit in the change in weight for a steel depends upon its thickness and its carbon alloy content. For example, a change in weight of -0.00050 gm. per sq. cm. will affect a piece of 0.020-in. thick, 0.70 per cent carbon steel to such a degree that it will lose most of its hardness and spring properties, while the same change in weight on the same type of steel having a thickness of 0.500 in. may not noticeably affect the maximum hardness. This is due to the fact that on the heavier section the carbon diffuses from the center to the surface, keeping pace with the rate of decarburization to such a degree as to keep the surface carbon content up enough to obtain the maximum hardness. The same amount of carbon is lost in both cases, but the thin stock is more materially affected. Thus on thin stock, the practical maximum allowable limit in the change in weight would be the same as the theoretical ± 0.00020 gm. per sq. cm. On heavier sections and tool steels this limit may go as far as a -0.00050 gm. per sq. cm. without affecting the maximum hardness or wearability. It should be kept in mind, however, that a loss in carbon may materially affect the wear resistance even though it does not affect the maximum hardness.

Controlled Atmosphere Used

The methods of protective heat treating used during the past and up to the present time but not including

FIG. 6—An 18-4-2 high speed tool steel decarburized at 1350 deg. to 1400 deg. F. in a preheat furnace. Magnification 100 diameters. Nital etchant. Hardened in a neutral atmosphere to show effects of decarburization.



the recent new developments are as follows:

- (1) Air-gas ratio method.
- (2) Pack hardening.
- (3) Carbonaceous muffle blocks.
- (4) Cracking a liquid hydrocarbon.

In order that the chemistry and chemical reaction can be discussed more readily, the chemical symbols will be used. These symbols and formulas are as follows:

CO₂ Carbon dioxide.
CO Carbon monoxide.
H₂ Hydrogen.
H₂O Water or water vapor.
CH₄ Methane.
C₂H₆ Ethane.
H₂S Hydrogen sulphide.

Air-Gas Ratio Method

The method of producing a protective atmosphere by means of burning a definite ratio of air to gas has been employed ever since gas fired furnaces were used for the heat treatment of high carbon and tool steels. Practical heat treaters employing a gas furnace in which the steel to be heat treated was exposed to the products of combustion soon learned that good or bad results could be obtained by a turn of a valve. In the use of such furnaces, the proper adjustment of the flame became an important phase in the art of heat treating.

When the electric hardening furnace was developed, this method of controlled atmosphere was applied to overcome the bad scaling and decarburizing properties of air. Such furnaces are equipped with flow gages to measure and ratio the air and gas which is then burnt in a separate compartment beneath the vestibule of the doorway of the furnace. The products of combustion are then passed up through a slot in the doorway vestibule, through the furnace chamber, and exit through a vent in the rear of the furnace top. Some furnaces are equipped with valves operated automatically from the door lever to burn a curtain of gas in the doorway vestibule whenever the door is opened so as to prevent an excessive amount of air from entering the furnace chamber.

Until recent years this has been one of the chief means of producing a controlled atmosphere for the heat treatment of tools. The use of this atmosphere for decarburization-free heat treatment of high carbon and tool steels is quite limited but not impossible on certain steels, provided a light scale can be permitted. It is impossible, however, to simultaneously obtain scale-free and decarburization-

free hardening. The scale can, however, be controlled to a minimum by not allowing the steel to soak at the hardening temperature. Although there are many analyses that can be obtained by various air-gas ratios, there is really only one air-gas ratio setting that can be applied, and only to a limited number of steels, for decarburization-free hardening. This ratio will produce an atmosphere containing from 2 to 5 per cent excess O₂ in the combusted gas with the remaining constituents of CO₂, H₂O, and N₂. A typical analysis produced by burning city gas with air for decarburization-free hardening of high-carbon and tool steels having hardening temperatures of not greater than 1600 deg. F. is as follows: 2.70 per cent O₂, 8.30 per cent CO₂, 17 per cent H₂O and 72 per cent N₂.

The small percentage of an excess of O₂ in a combusted gas is very important to subdue the decarburizing properties of CO₂ and H₂O. The addition of a third decarburizing gas to offset the effects of two others seems quite ridiculous but nevertheless works out satisfactorily. The theory of such an atmosphere may be explained on the basis that the slight excess of O₂ forms an impervious type of oxide scale that acts as a protective coating. The CO₂ and H₂O constituents are also oxidizing gases, but these seem to oxidize the carbon of the steel selectively over the iron, thus producing only a half-hearted, spongy type of iron oxide scale with a decarburized steel layer beneath it. The oxide film produced by the O₂ seems to act as a barrier to prevent the diffusion of the carbon of the steel to the surface and thus prevents the oxidation of the carbon, decarburization, from proceeding at a faster rate than the oxidation of the iron. The only decarburization occurring below 1600 deg. F. is that in the oxide of the film or scale itself. Above 1600 deg. F. this phenomenon no longer exists; the decarburization begins to proceed at a faster rate than the scaling, producing a soft skin beneath the scale.

The best results are obtained on a high-carbon water-hardening tool steel or a manganese oil-hardening tool steel having hardening temperatures from 1375 deg. F. to 1475 deg. F. At these temperatures only a very thin film of scale is produced, especially if the steel is quenched when it reaches the hardening temperature and is not allowed to soak. Photomicrographs in Figs. 1 and 2 show that a high-carbon water-hardening tool steel or a manganese oil-hardening tool steel can be

heat treated free from a visual decarburization even when soaked for 2 hr. at the hardening temperature. This is also true of a silicon tool steel, Fig. 3, heat treated at 1550 deg. F. and soaked for 2 hr. At this temperature, however, the steel begins to pit and scale to quite an appreciable extent and prolonged soaking must be avoided. Above a temperature of 1600 deg. F. this atmosphere is no longer useful; both bad scaling and decarburization take place. This is shown by the photomicrographs in Figs. 4 and 5, a tungsten alloy chisel steel and a high carbon-high chromium tool steel heat treated at 1750 deg. F.

One of the biggest mistakes made by many users of this type of atmosphere is to adjust the air-gas ratio so that scale-free hardening can be approached or obtained. Any air-gas ratio from one that will produce a sooty or "reducing" atmosphere down to a "neutral" atmosphere (no CO or O₂) will produce decarburization. In tool work—if one of the two evils of scale or decarburization must accompany hardening—it is much better to produce a light scale that must be ground off before the tool can be put into service, than it is to produce a scale-free tool that may go into service without a grind and thus with a soft skin or decarburized surface.

In the case of high speed steels, an air-gas ratio is used that will produce a so-called "reducing" atmosphere containing as much CO as possible without becoming sooty. Although this composition is decarburizing and scaling to all high speed steels, it is the least decarburizing and scaling that can be obtained from the air-gas ratio atmosphere. Tools heat treated in such an atmosphere cannot be put into service without a grind as a soft skin is always present to some degree. The amount of decarburization will depend upon the type of steel and the time required for hardening. The 8.0 to 9.0 per cent molybdenum type of high speed steels cannot be heat treated in this type of atmosphere; the depth of decarburization becomes so great that its removal by grinding becomes almost impracticable.

The atmosphere used in the pre-heating furnace for high speed steels is just as important toward decarburization-free hardening as the atmosphere used in the hardening furnace. High speed steels will decarburize at temperatures as low as 1350 deg. F. The author experienced this when making an investigation to determine the cause of soft, high speed, circular form cutters. The cutters were found

to be decarburized 0.035 in., practically through the cutting edge. This can be seen in the photomicrograph in Fig. 6. The cause of this decarburization was traced down to the preheating furnace. The cutters were preheated in the front zone of an air-gas ratio type of atmosphere furnace at a temperature between 1300 deg. and 1400 deg. F. The atmosphere on this furnace is usually adjusted so as to be slightly oxidizing, but at the time when this particular batch of cutters was preheated, the reducing valve stuck on the air line, and the atmosphere fluctuated between a neutral (0 per cent O_2 and 0 per cent CO) and a slightly reducing one. A record of the total time

the cutters remained in the preheat furnace was not obtainable, but inasmuch as the cutters were rehardened several times, the heat treater estimated the time between 1 and 2 hr. The cutters were hardened at the high temperature in a carbonaceous muffle block furnace. Cutters hardened in this furnace without a preheat showed no trace of decarburization.

The air-gas ratio for preheating should either be set to give an atmosphere containing about 3 per cent excess oxygen or one that is very "reducing," just short of being sooty. Many prefer the oxidizing type to oxidize the steel slightly so as to protect it against the decarburizing action

at the high heat. If a molybdenum high speed steel is used, the preheating atmosphere should be the reducing one so as not to de-molybdenumize the steel. Any atmosphere obtained from the air-gas ratio method is decarburizing to some degree or another to any high speed steel, and a better atmosphere is desired for hardening totally free from decarburization for tools that may not permit grinding.

Ed. Note:—In the second section next week the author describes pack hardening, the necessity for better atmosphere in heat treatment of high carbon and tool steels, etc.

Automatic X-Raying 5000 Parts Per Day

INSTALLATION of a new, fully automatic X-ray machine that will photograph 5000 average parts per day has been completed at the Triplett & Barton laboratories in the Lockheed factory, Burbank, Cal. Representing a complete departure from equipment previously used, both as to speed of operation and design, this machine is regarded as one of the answers to the stepping up of aircraft production to 10, 25 or 50 thousand planes a year.

All the high voltage X-ray equipment is housed in a black and chromium-trimmed cabinet 10 ft. high and 4 ft. square. Projecting from the bottom of the cabinet on both sides are chromium-covered braces for the conveyor table that works in shuttle fashion from one side to the other. The cabinet and table are lined with 1500 lb. of lead to completely shield the operator from the high voltage X-rays.

The focal spot of the machine is extremely small in order to obtain radiographs that will show clearly the smallest defects, yet parts of any length up to 30 ft., and not more than 2 ft. in diameter can be handled.

The portion of the cabinet housing the X-ray tube and transformer works on an automatically controlled electric lift that raises it above the table on which the parts to be X-rayed are placed. When the photographic control is turned on, the cabinet is lowered in place and held there until the picture has been taken. It is then raised automatically and the sliding table, with its set-up of parts, pulled into position for the next photograph,

the extension with the parts just photographed being shifted to the opposite side of the cabinet. The parts are either replaced with a new set-up or rearranged for the second or third view, whichever is called for. The timing, together with the period of X-ray exposure desired, can be pre-set by the operator. The rapidity with which parts can be X-rayed is dependent on the skill of the operator. During rush periods two or more men may be kept busy.

A safety bar on the under edge of the cabinet, so sensitive that it will react to the slightest pressure, will stop the machine at any point during the time the cabinet is being raised or lowered into position.

All parts of the machine are jig fabricated to insure interchangeability. Some of them were made by Spencer & Morris and the Varnum Engine Co., Los Angeles. All controls, tubes and transformers were constructed in Triplett & Barton's own shops.

The X-ray inspection was started in the Lockheed plant five years ago. At first it was regarded purely as an experiment, and at the outset only 10 per cent

of class 1 and stress parts were X-rayed. Experience proved, however, that insurance against structural failure required the 100 per cent X-raying of these parts. It also revealed that construction expense could be cut and time saved by this procedure.

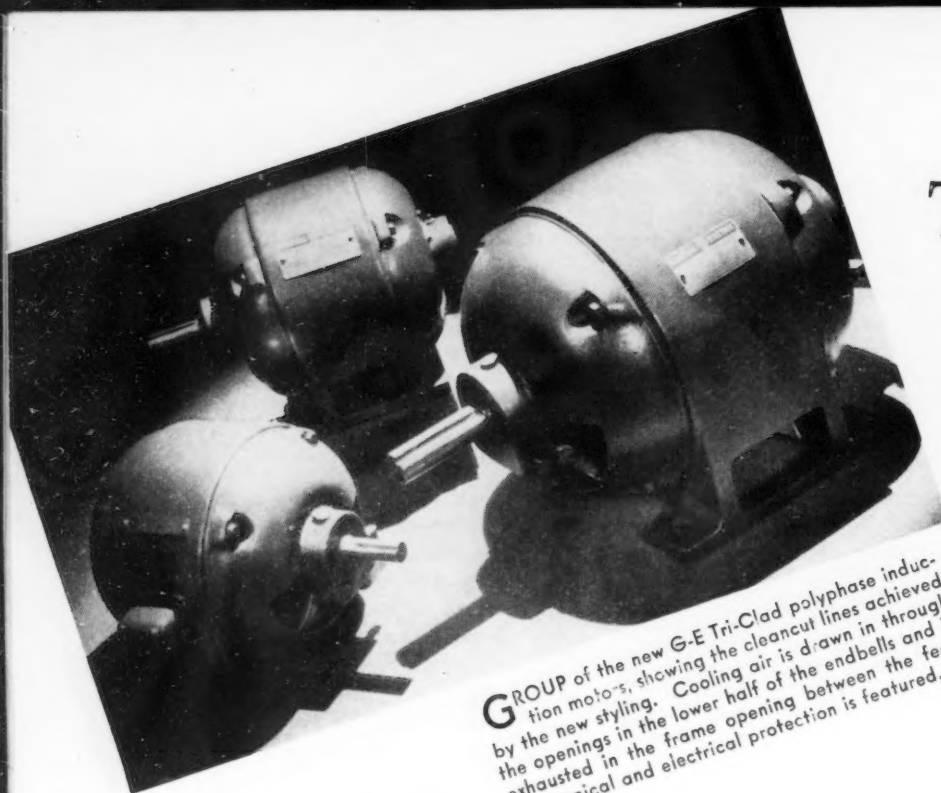
The rejection of parts from a single foundry shipment will sometimes run into the hundreds. These flaws as a rule are caused by the faulty pouring or mixing of the alloys from which the parts are made.



Tri-Clad Motors

Announced

by G-E



GROUP of the new G-E Tri-Clad polyphase induction motors, showing the clean-cut lines achieved by the new styling. Cooling air is drawn in through the openings in the lower half of the endbells and is exhausted in the frame opening between the feet. Mechanical and electrical protection is featured.

OUTSTANDING mechanical and electrical protective features are to be found in an entire line of completely new polyphase induction motors just announced by General Electric Co. Known as the Tri-Clad motor and representing one of the most extensive product changes in the history of the company, it has called for many new methods and new materials in motor manufacturing. In all its ratings, the motor features modern streamlined appearance, more complete protection than heretofore available except in especially enclosed machines, major advances in electrical insulation, and improved bearing design and lubricating arrangements. At the same time, the line retains the cast aluminum rotor, pressure relief system of greasing for ball-bearing motors and other proven features.

In appearance the motor frame has simple surfaces with few recesses or projections. Box type frame is made of cast iron by a new foundry technique that assures concentricity of the core and hence the most effective distribution of the metal. The end shields are designed to match the frame and are enclosed above the center line thus offering a greater degree of protection against the entrance of falling liquid or particles than existed in previous open motor designs. Sleeve bearings or ball bearings are interchangeable for the same frame sizes.

Principal feature of the sleeve bearing design is that the length is much

shorter than in previous conventional practice—averaging 1.5 times the diameter. The design is intended to overcome the concentration of high unit bearing pressures at the end of the bearing resulting from shaft deflections under load. By using a shorter bearing length, the deflection of the shaft inside the bearing can be maintained at a value less than the thickness of the oil film. To assure that the oil film is maintained over all parts of the bearing lining under heavy load, a spiral type of grooving has been developed to give the assurance of thorough oil distribution under the worst operating conditions. A complete sleeve bearing utilizes hard tin babbitt centrifugally cast into a steel shell. The bearing is rigidly supported through 360 deg. and is locked in a dust-tight, oil-tight enclosure. The bearings are lubricated by an oil ring dipping into a reservoir. The oil filler gage can be located on either side. In all frames larger than frame 254, a drain plug permits complete draining of the bearing housing without tilting the motor.

The same assembly of shaft and rotor is used on many popular sizes of both sleeve and ball-bearing motors. Thus many sleeve bearing motors may be converted to ball bearing by changing only the end shields, bearings and caps.

Large integrally cast rotor fans draw low velocity air through openings in the lower portion of each end shield. Efficiency of cooling is increased through the use of large, smooth air passageways and baffles which control its direction, velocity and discharge

through openings in the frame just above the motor feet.

Performance of the motor has been considerably increased and higher horsepower outputs are being obtained in smaller frame sizes than heretofore. Improvements have been made in the silicon steel for the stator and rotor laminations, and the air gaps between them have been reduced, largely as a result of the improved bearing design. The greatest gain in space saving and electrical characteristics has been obtained through the use of the new Formex magnet wire, developed by General Electric after ten years of research and now used on all ratings of the new motor. Because Formex is a tough, heat and solvent-resisting magnet wire, it is now possible to eliminate largely the older type paper, cotton coverings, and other fibrous materials thus saving considerably on slot space. Abrasion tests have shown Formex to be superior to conventional enameled magnet wire in the ratio of about three to one.

Motor windings are further protected by the application of an improved synthetic resin varnish and a covering coat of Glyptal red. Glyptal No. 1201 red is an alkyd-resin material which gives the coils not only a neat appearance but also a moisture, acid, oil and arc resisting surface. In the double end system of ventilation, cool air drawn into both ends of the motor immediately impinges against the coil extensions, resulting in equally low temperature of these parts at both ends of the motor. The motor operates well within the standard 40 deg. C. temperature rise. The Formex wire itself is particularly resistant to heat shock which usually manifests itself in ordinary magnet wire by cracking of the surface due to internal strains set up during the forming operation.

Westinghouse

Introduces New

Motor Sizes



T. C. KELLEY (right), manager of motor sales, shows R. W. Owens (left), motor division manager, and A. C. Streamer (center), head of Westinghouse's East Pittsburgh works, the latest model in motors. Smallness, and smart appearance of this motor built in accordance with the revised NEMA standards which became effective Oct. 1, are illustrated by comparison with the older model at the left. Both these motors have

FIRST major change in the original motor dimension standards adopted by members of the National Electrical Manufacturers Association since 1928 was put into effect Oct. 1 when a new frame size, 203, was added and new assignments were made to small, open horizontal and vertical motors of frames 204 and 224. In effect the previous horsepower-speed ratings have been reduced one frame size, thus resulting in saving in weight, space and size. Smaller motors are now possible because of two major improvements, in core iron and in insulation. Silicon steels have been greatly improved until now less motor iron is necessary to produce the same horsepower. New synthetics and new cloth insulations of higher dielectric strength have been developed which permit coil insulation of the same quality as formerly in a smaller space.

Westinghouse has just completed a broad program of small motor redesign which covers a much wider scope of improvements than are called for by the new standards. Whereas, smaller dimensions and lighter weights called for by the new standards will affect only those motors from $\frac{3}{4}$ to 2 hp., the Westinghouse program affects motors in the wider range from $\frac{1}{2}$ to 3 hp. Frame shapes have been redesigned and a new bracing structure gives them more strength although they are lighter. Ball and sleeve bearings and their housings have new type seals against dirt which are far more efficient than those used on the old motors. Blending of motors and machines for smart appearance now demanded by industry has been met by use of smooth finish and curved lines. All frame corners are rounded.

Typical of the new compactness is the new Westinghouse $1\frac{1}{2}$ -hp. squirrel cage induction motor which weighs

25 per cent less and occupies 27 per cent less space than its prototypes of the same speed ratings.

The new NEMA ratings are shown in the accompanying table. The present standard mounting dimensions applying to frames 204 and 224 are not changed, although some of the other dimensions may be changed slightly.

For the new 203 frame, the dimensions are the same as for frame 204 except that the maximum overall width at the feet is $6\frac{5}{8}$ in. (1 in. less than for frame 204), and the centerline to bolt hole in foot is $2\frac{3}{4}$ in.

New NEMA Small Motor Standards

General Purpose Squirrel Cage Motors

Open, Horizontal		Continuous Duty, 40° C. Rise 110, 220, 440 and 550 volts, 2 and 3 phase, 60 cycles*		
Frame Number	3500 r.p.m.	Horsepower at Approximate Speed of		875 r.p.m.
203	$1\frac{1}{2}$ *	1750 r.p.m.	1150 r.p.m.	
204	2	1*	$\frac{3}{4}$ *	
224	3	$1\frac{1}{2}$ *	1	$\frac{1}{2}$
225	5	2*	$1\frac{1}{2}$	$\frac{3}{4}$
		3	2	1

Open, 60 cycle motors are satisfactory for operation on 50 cycles.

Temperature rise will not exceed 50° C. continuous.

These ratings also apply to d.c. motors, 115 or 230 volts.

Single Phase Motors

Open, Horizontal		Continuous Duty, 40° C. Rise 110/220 Volts, Single Phase, 60 cycles*		
Frame Number	3500 r.p.m.	Horsepower at Approximate Speed of		1150 r.p.m.
203	$1\frac{1}{2}$ *	1750 r.p.m.	1150 r.p.m.	
204	2*	1*	$\frac{3}{4}$ *	
224	3	$1\frac{1}{2}$ *	1	$\frac{3}{4}$
225	5	2*	$1\frac{1}{2}$	1
		3		$1\frac{1}{2}$

These motors can be operated on 50 cycles.

*Ratings changed by NEMA standards revision.

Salt Bath Heating for Forging

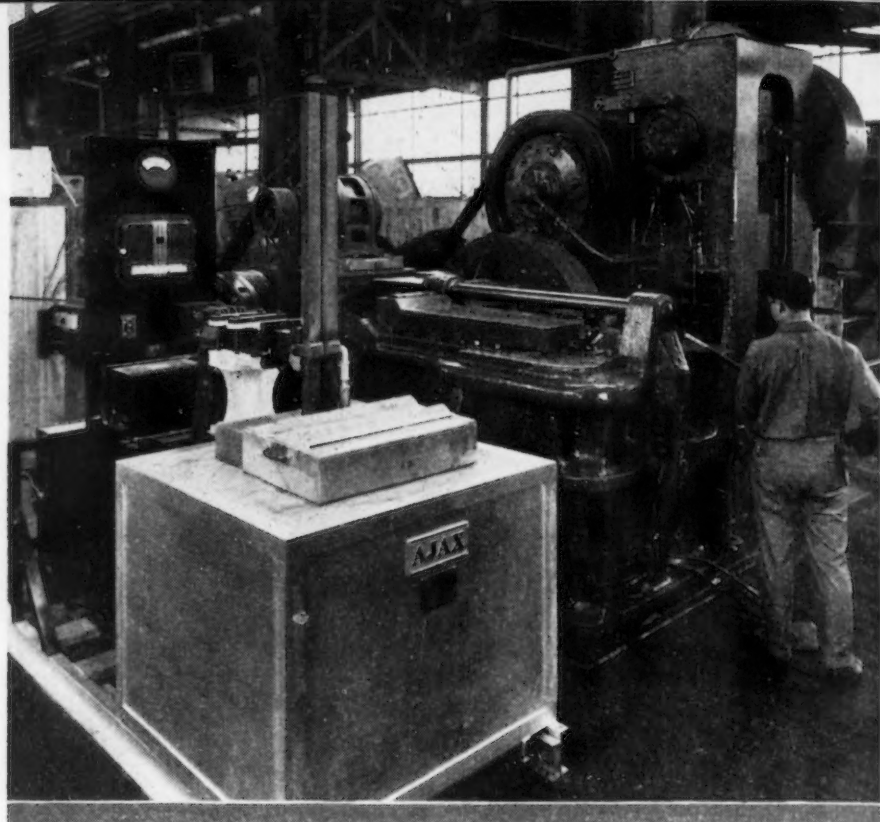
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WIDESPREAD interest has been aroused recently by the use of an Ajax-Hultgren electric salt bath furnace to heat bar stock for testing dies in forging machines and presses at the plant of Ajax Mfg. Co., in Euclid, Ohio, suburb of Cleveland.

The Ajax Mfg. Co. (which has no connection with the company making Ajax-Hultgren furnaces) builds a number of types of hot metal working machines including upsetting forging machines, forging presses and forging rolls. These machines are generally sold equipped with a set of forging dies which must be developed and tested in their plant prior to shipment. Heretofore it has been necessary to move these machines to a test floor with permanently constructed oil type furnace, whereas the salt bath furnace is fitted with lift rings so that it can be transferred by crane to any part of the erecting floor where its service is required. Bars heated in this furnace are free from the formation of scale, because during heating they are completely immersed in the salt bath. Another advantage is the fact that the heat is absolutely uniform and is held to whatever close temperature limits are required for the particular forging being produced.

Bars up to 5 in. diameter are being heated in the Cleveland plant. Three-minute cycles are employed on 1-in. bars, with 4 to 5 in. being heated on each bar. With a six-position holder the output of the furnace thus is equivalent to one heat every ½ min.

Other size holders than the six-position unit can be used, of course. An alloy steel plate, immersed in the salt



VIEW of new Ajax-Hultgren electric salt bath furnace at the plant of Ajax Mfg. Co., Cleveland. Operator has removed a hot bar from the furnace and is about to put it in the forging machine to test the die.

o o

bath, can be adjusted vertically for any length of bar desired to be heated. In practice at the Cleveland plant bars are only immersed to the length required for making the test forgings. Oxidation is prevented on the submerged portion.

Taken out of the bath, the bar is tapped lightly by the operator to remove excess salt and is placed in an adjacent forging machine. While the hot piece is being transferred from the furnace to the forging machine, the film of liquid salt clinging to the surface maintains protection of the surface.

Two electrodes, closely spaced, are immersed in the salt. Electromagnetic stirring action is obtained. The liquid can be seen circulating. The Cleveland company is using E. F. Houghton's "Liquid F."

Temperatures can be varied, depending on the type of steel being used, but the Cleveland company uses a temperature of around 2200 deg. F. and when the furnace is idling, the temperature is dropped back to around 1700 to 1800 deg. F. Lest the salt solidify, the furnace is kept on 24 hr. per day.

The Ajax-Hultgren furnace is capable of using any number of groups of electrodes, containing two, three or more electrodes per group. A low voltage, from 5 to 25 volts, is obtained by means of a step-down transformer.

Alternating current then flows through the molten salt lying in the gap between the electrodes, which heats the salt by virtue of its own resistance to the flow of current. Any desired "atmosphere" in the bath may be obtained.

Temperatures are controlled in the Cleveland installation by a Leeds & Northrup Micromax system.

Speed of heating is dependent only on the conductivity of the steel. The time required for the bath to recover temperature after a cold charge is placed in it is very short. More power is instantly available and distributed through the bath by the automatic stirring action. A heavy wall of insulation around the furnace prevents excessive radiation.

Because of the absence of scale, increased die life is attained, according to Ajax Electric Co., Inc. Other advantages include: minimum grain growth due to fast heating cycles; no decarburization, selective heating with sharp line between heated and unheated portions, low operating costs, and improved working conditions due to the lack of excessive heat or obnoxious fumes.

The use of salt baths to heat steel is finding favor in other directions, also. There are now many Ajax-Hultgren salt bath furnaces in use for shell nosing, the sizes varying from 75 mm. up to 18-in. aircraft bombs.

Making Carbide Tools . . .

THE axe has fallen! A prominent carbide tool manufacturer some weeks ago announced price reductions of approximately 60 per cent. Undoubtedly by the time this article is in print other carbide tool manufacturers will have followed suit. This terrific drop in prices of carbide tools will set them up as without an economical equal among metal cutting tools. The price reductions have brought a new and closer ratio between initial tool costs and tool costs per unit produced, giving an even greater economic appeal to carbide cutting tools.

Manufacturers, large and small, who have hesitated to use carbide tools will be encouraged to do so now that prices are more in line with budget allowances. There will be demands for services, demonstrations, and instructions will tax the capacities of the carbide manufacturers to provide them. Somebody will have to wait his turn. This will cause many a prospective user of carbide tools to turn to reading matter on the subject. He may read about control methods and readily understand them because they savor of the fundamentals of most any principle of tool or manufacturing control. But when it comes to *making* carbide tools—well—that's just like meeting up with a "new breed of pups." Carbide tools are different because they seem to violate all the old established laws of metal cutting technique.

The new prices of carbide tools, will, for the time being, affect only a very limited number of styles. Volume demand and production determine that. Because of this, consumers of carbide tools will have still to make their own tools, that is, to buy the carbide blanks and braze them onto

the desired sizes and styles of tool shanks. The manufacturers of carbide tools give very thorough instructions in their sales literature as to the manner of brazing carbide blanks to shanks and also the grinding technique involved to bring the tool up to metal cutting condition.

There are numerous other factors that must be considered when building carbide tools in order to obtain the fullest efficiency from them. The field is so large it would be practically impossible for the carbide manufacturers to cover every type of carbide tool used in metal cutting. Special forms and shapes of tools involve too many intricacies for specific instructions other than the fundamental knowledge of carbide tools and their performance. It almost resolves itself to the "make, cut, and learn" method of acquiring carbide tooling knowledge.

The major consideration to bear in mind when building carbide tools is *stability*—good solid support for the carbide blank. Vibration is poison to carbide tools. They'll fracture up like a hunk of chalk. But give them good support and foundation and they'll eat into metal cutting duties with thoroughbred vigor and stamina. Proper grade and quality have plenty to do with that, too.

Boring bits were considered at one

time to be a type of tool very detrimental to carbide tips. Carbide salesmen would steer clear of any such tool entanglements and concentrate on heavy shanked tools. There was less chance of failure. The prevailing types of boring bars and flybars were, of course, designed for high speed steels and a little vibration did no harm. But the mistake was to use carbide tools in these types of boring bars without due consideration to excessive vibrations. Then, too, the centerline set-up of the high speed steel bits in the boring bar was not so important as with carbide tipped bits.

The conventional bar with, for example, a $\frac{3}{8}$ -in. square hole for a square tool bit, will have the cutting edge of the tool approximately $\frac{3}{16}$ in. above center. A cross-sectional end view of this type of bar is shown in Fig. 1. The circle representing a $1\frac{1}{2}$ -in. hole illustrates the relation of the centerline and the cutting edge of the average high speed steel tool bit. Note the negative angle at *A* where the work passes over the tool against all laws of correct cutting procedures. Clean, smooth cutting results are practically impossible. The cutting strain as denoted by the direction of the arrow, has a tendency to break off the tip of the high speed steel tool bit and would positively do so if the tool were

By GAYLORD G. THOMPSON

Madison, Wis.

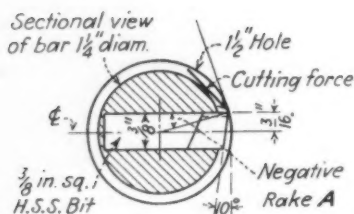


FIG. 1—The conventional boring bar with a high speed steel bit set $\frac{3}{16}$ in. above the center of the bar produces in effect a negative rake and a cutting force at the angle shown. A carbide tool would fail in this application.

carbide tipped. Unless proper angles and rakes are ground in the carbide bit, it is doomed to complete failure in this type of bar.

Fig. 2 shows a carbide tipped boring bit that was condemned and described as the "screwiest looking tool." Machine operators turned it down with vehement protestations. "It didn't have enough clearance under the cutting edge. It would drag on the heel," they said.

Now look at Fig. 3. Note how the tool fits into the prescribed circle representing the $1\frac{1}{2}$ -in. hole it is to finish bore. Note the 26-deg. angle necessary to provide a 6-deg. top rake on the tool because of its position in the conventional type of boring bar. And most important of all is the 7-deg. negative rake or front clearance that condemned the tool on sight. Yet this negative angle gave such thorough support to the cutting edge of the carbide that it finished bored 48 holes, removing 0.010 in. stock at a speed of 300 ft. per min. and retaining the diametrical dimension within 0.005 in. The material was a 25 per cent semi-steel casting and each bore had a screw hole in the wall, causing intermittent cutting. The length of each hole was approximately 3 in. or a total bore of 144 in. At the end of this performance, which was the best that was ever accomplished by any tool in the history of the company insofar as accuracy and life of the cutting edge were concerned, the tool was still capable of continuing without resharpening.

Unconventional Boring Bit

The tool as shown in Fig. 2 happens to be a finishing tool and has angles ground for light cuts. However, for heavy cuts, the 26-deg. top back rake is just as essential and should be accompanied with a 5-deg. top side rake for boring cast iron on all sizes of holes and for small holes up to approximately $1\frac{1}{2}$ in. in steel. The boring of larger holes in steel could be accomplished with less chip trouble if

the top side rake was straight and the 5-deg. angle or its equivalent retained in the grinding of the chip curler along the front or the cutting edge of the tool. Bear in mind, however, the angle as shown as 26 deg. (top back rake) should always be retained under similar dimension conditions as shown in the illustration. Where large boring bars or boring bits are involved, the top back rake angle will change proportionately. If light high speed finishing cuts are all that will be required of a tool, it should not be necessary to provide top side rake angles or chip curlers.

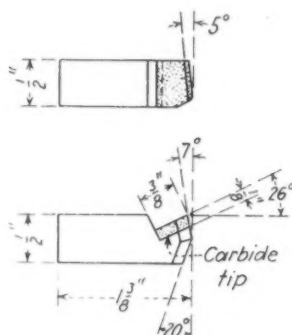


FIG. 2—Apart from its set-up in a boring bar, this design of carbide tipped boring tool looks "screwy" to say the least. Yet it was highly successful.

While on the subject of carbide boring bits, it might be well to mention here an example of what can be done to stiffen up boring bars so that greater life can be had from the carbide bits.

Fig. 4 shows two types of boring bars. The bar shown at A is the usual type of piloted boring bar used on turret lathes. These bars are of necessity rather long in order to reach into the pilot bushing located deep in the chuck body and to have sufficient length to permit simultaneous operation of the cross slide during the boring operation. Bars of this type have a considerable amount of spring and vibration in the small sizes and, of course, these conditions would be very detrimental to carbide boring bits.

The type of bar shown at B together with its holder C in Fig. 4 is a sort of a telescopic bar in that the bar can be adjusted in the holder to any length desired within its limits. The holder C in turn can be set in any position in the turret within the limits provided by the flat portion for the turret clamp screw. The large diameter of the holder extending out from the turret provides a stiff support for the boring bar up to the location of the tool bit and yet permits sufficient overhang for simultaneous operation of the cross slide.

The strength and stiffness of the holder also permit the use of fly bars, that is, a boring bar without the pilot extension. It is indeed gratifying to note how this extension or telescopic bar eliminates chatter in the boring of small holes regardless of whether carbide tools or any other tool bits are used.

Carbide turning and facing tools provide a greater latitude of designs and dimensional factors than do boring bits. In the design of boring bits and boring bars, the trend toward ruggedness and stability is limited by the very nature of the work to be performed. The diameter of the hole to be bored limits the diameter of the bar to be used; consequently no more can be done about that and the resultant chattering unless special fixtures and tools are used. But with turning and facing tools, the limitations are not so confining. In most applications, shanks can be made as rugged and solid as necessary for the proper support of carbide tips.

About the first question that comes to the mind of any production executive about to make his own carbide tools is cost. Carbide tools can be made in such styles and designs as to be very costly and again they can be made at a very reasonable price. This depends on how the tool is to be used.

Carbide tool manufacturers have been supplying a number of designs of tools in which the carbide tips are neatly fitted into machined pockets in the shanks and then brazed in place. This all adds to the appearance of the tool and is also impressive in its ruggedness because the carbide tip or blank is surrounded on two or three sides with supporting shoulders of the steel shank in addition to the brazing. But, is all of this necessary? The reaction of a vice-president of a manufacturing concern to this question was interesting.

Several tools were made up as shown in Figs. 5 and 6. Instead of end milling a neat pocket in the shanks to fit the carbide blanks, the nose of the shank was milled straight across the top at the depth suitable for the carbide blank. The blanks were then

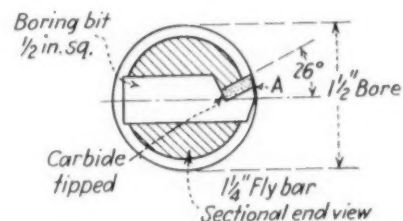


FIG. 3—The tool illustrated in Fig. 2 is shown mounted in a boring bar for performing a job similar to that of Fig. 1.

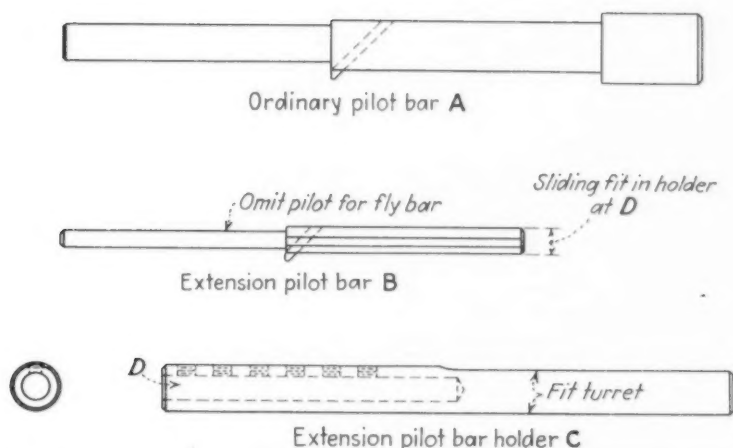


FIG. 4—The extension pilot bar holder C gives a much stiffer support for a carbide boring bit than does the conventional bar and pilot extension shown at A.

brazed in place. They had only one supporting shoulder of the shank as shown at A. All the rest of the carbide tip or blank was "out in the open" with no other support than the brazing underneath to hold it to the shank when under cutting strain. The blank hollows or recesses as designated by the letter B truthfully did give the tools a crude, unfinished appearance.

"Why, man!" exclaimed the v-p., "I wouldn't dare to send a tool looking like that to our customer! It looks too unfinished to be rated with the high quality finish of our machine tools."

Although these tools would not be accepted because of their very crudeness, as part of machine tool equipment, yet they were "tops" in the shop because of economy in making. It is much faster to clamp a row of these shanks on the milling machine table and mill straight through them all than the slow process of end milling each individual shank. Then, too, there would be the additional grinding operations to fit the carbide blanks to the pockets. Anyone who has done much grinding of carbides can appreciate this disagreeable operation especially with small blanks and the toll this operation takes of silicon wheels.

These questions may be asked. Do carbide tools built in this manner stand up? Is it not necessary to give support to the carbide blank—to back it up from every possible angle so that shifting of the blank might be avoided?

Take a look at Fig. 7. This is an actual photograph of a style 07 carbide tool, as shown in Fig. 5, diving into a counterboring operation on a heat treated forged steel ring gear. It is cutting at a speed of 340 ft. per min., $\frac{3}{8}$ in. deep and with 0.017 in. feed on a Gisholt No. 31 turret lathe. The gear had previously been turned and bored simultaneously at approxi-

mately the same dimension of cuts and corresponding speeds.

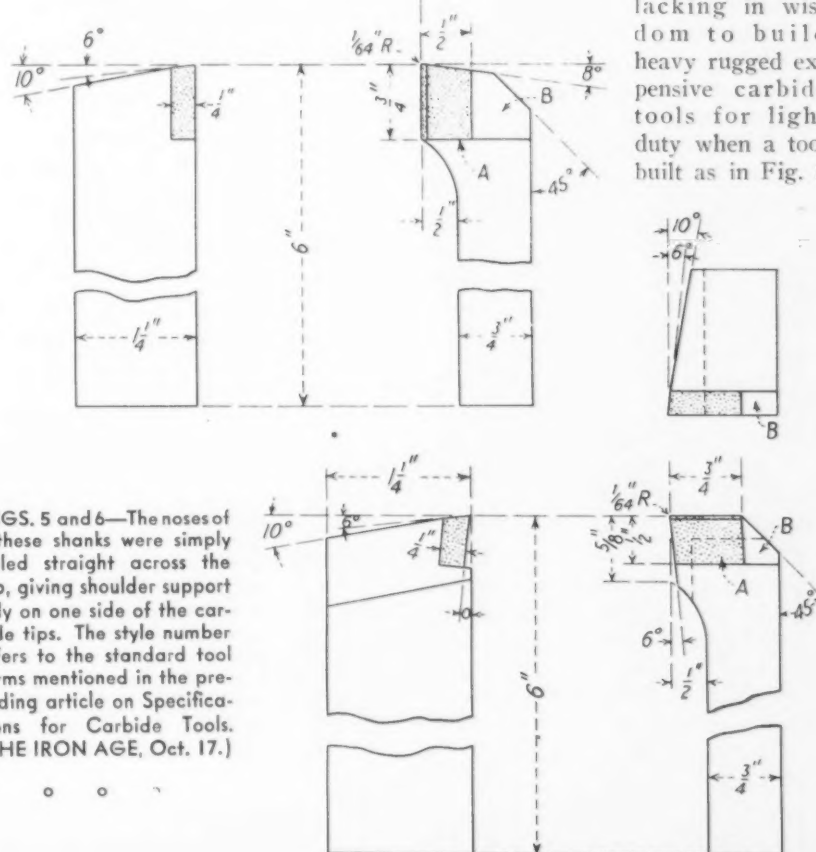
Note that little triangular shadow at the nose of the tool. It is that open space as designated by B in Figs. 5 and 6 and which caused the emphatic "thumbs down" by the v-p. Note, too, that the cuts are being made *dry*. This eliminates any suggestion that heat generated by the cutting action of the tool would soften the brazing and cause the blank to slide off of the shank.

Carbide blanks have no elasticity. A shift of a minute fraction of an inch would fracture the carbide. Consequently, shoulder support from the

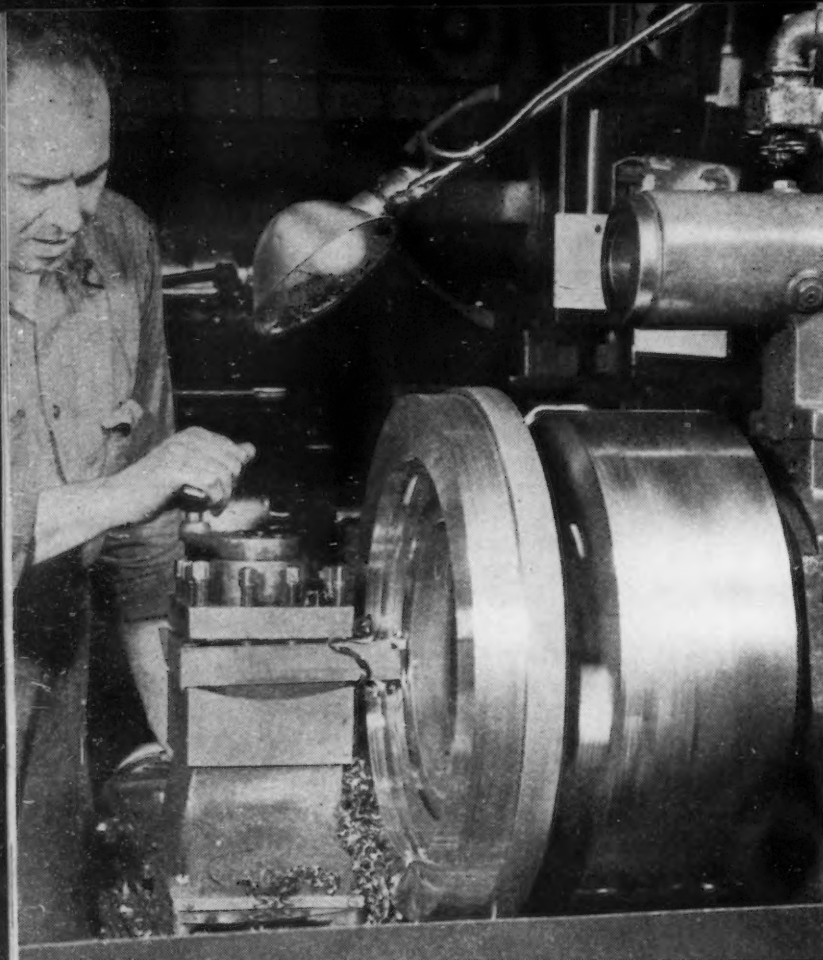
shank can do no good. In fact, such support would be more damaging in that the blank would be crushed beyond salvaging, whereas if the blank was merely supported by the brazing and one shoulder (and not even that is necessary), the blank could very likely be salvaged if the brazed joint gave way. It is more economical to fail to hold the carbide blank at the brazing than to gamble on it plowing through breaking strains. Even at that, brazing will be found to hold its own when matched with the fracturing stresses of carbide blanks.

Now, while on the subject of strength of brazing versus strength of carbides, how does the tool shown in Fig. 8 look? Its very appearance would elicit the same classification of sarcasm as the "cheese box on a raft." Yes, sir, it is just a hunk of carbide brazed on the end of a suitable shank. A tool with the exact dimensions as shown in the illustration was used for facing forged steel gear blanks. The cuts averaged $\frac{3}{16}$ in. deep and the feeds 0.015 in. per rev. cutting from 300 down to 150 ft. per min. as the diameter of the cut became smaller during the facing operation.

In view of the performance of this tool it would seem entirely lacking in wisdom to build heavy rugged expensive carbide tools for light duty when a tool built as in Fig. 8



FIGS. 5 and 6—The noses of these shanks were simply milled straight across the top, giving shoulder support only on one side of the carbide tips. The style number refers to the standard tool forms mentioned in the preceding article on Specifications for Carbide Tools. (THE IRON AGE, Oct. 17.)



LEFT
FIG. 7 — Counter-boring operation on a heat treated forged steel ring gear, using the tool shown in Fig. 6.

duties would cover the same classification as shown in Fig. 5, namely, facing.

The tool as shown in Fig. 9 is by far the most economical to build although it involves a little more complications for the brazing operation. But given proper fixtures for quantity production, this tool is easy to produce. It will take as much abuse as the more expensive tool shown in Fig. 5. A turning tool can be constructed in the same manner as that of the facing tool in Fig. 9 by simply brazing the anvil and carbide to the side of the shank.

Note that the carbide blanks shown in Figs. 5 and 6 are of the same size. It is good and economical practice to hold the variety of carbide blank sizes down to the very minimum. And this also applies to grades of carbides, too. The inventory of carbide blanks which may be kept in stock does not have to be so large to meet anticipated requirements or replacements of broken tips. Better discounts are enjoyed because of larger purchases of unit sizes made possible by standardization.

will suffice. Even though this tool might be an "ugly duckling," it still is a very economical and efficient one. The carbide blank was not ground to remove the scale or film before brazing. It was just given a pickling bath and then brazed to the shank. It held so firmly that the practice of grinding carbide blanks for brazing was discontinued.

There are several features incorporated in the tool illustrated in Fig. 8. The 6-deg. angle on the front of the shank provides the necessary clearance angle for the cutting edge. This eliminates much grinding other than for the top angles. When the tool is to be used for cutting bronze, the 6-deg. angle on the top can be left as it is, in which case the only grinding that will be necessary will be for sharpening the tool. Of course, as the bit wears down to a small size, the remaining piece of carbide can be removed and used on smaller types of tools and the shank used over again.

The same principle of construction of the tool in Fig. 8 could be followed if a turning tool is to be made, the difference being that the blank would be brazed to the side of the shank instead of the front as with the facing tool.

Another type of turning or facing tool is shown in Fig. 8. The design and construction of this tool permit of greater offset of the cutting edge. Its

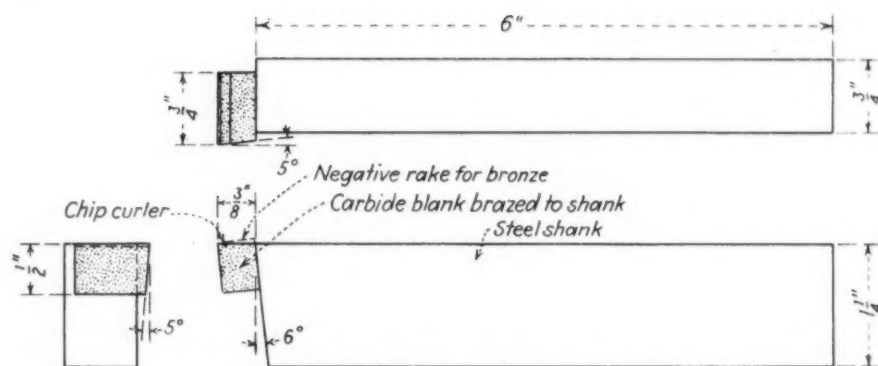


FIG. 8—This unorthodox method of mounting a carbide tip on a shank has been successfully used in making a facing tool for steel gear blanks.

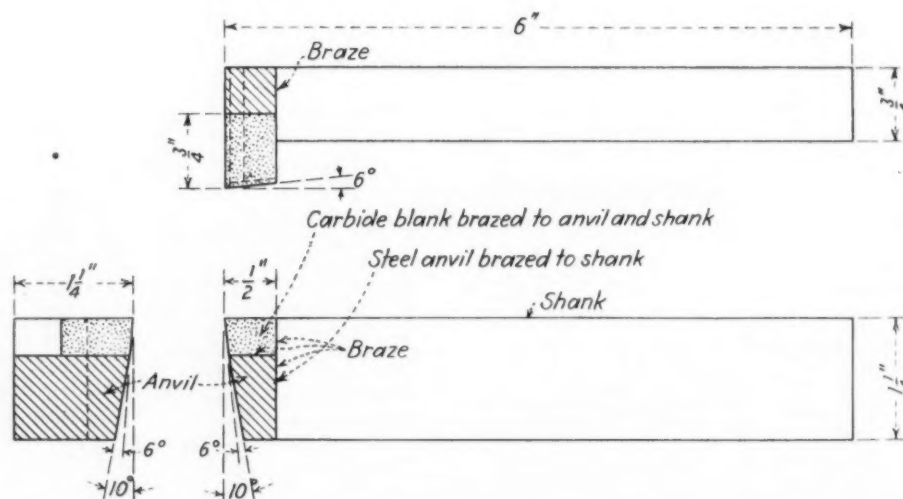


FIG. 9—Greater offset of the cutting edge is permitted by this construction, which is somewhat more economical than the modified form of facing tool shown in Fig. 5.

Stainless Steel

**—Deep drawing and spinning
technique at the Lalance &
Grosjean Mfg. Co. plant**

By HERBERT CHASE

• • •

FEW, if any, plants have accomplished so much in certain types of deep drawing and spinning of stainless steel as has that of Lalance & Grosjean Mfg. Co., Woodhaven, N. Y. Experience in similar operations in this plant dates back several decades, but only in recent years has the plant been converted to work chiefly in stainless steel.

Formerly, the plant was a large producer of enamel kitchen ware, a type of work now abandoned for a more expensive as well as a more profitable line in which stainless utensils are prominent. The utensils, however, are not confined to kitchen types. Various large containers as well as a line of small ones are manufactured for hotels, hospitals, food plants, etc., in more or less standard lines, but this work is also supplemented by products made under contract for chemical plants and food plants and for producers of mixers, ice cream machines, carbonating gas and other equipment who have neither the tools nor the experience required for the drawing and spinning of stainless steel. Also produced are high grade articles, mostly deep drawn from mild steel, which are subsequently given heavy coatings of tin. Although some work has been done in

Monel and nickel alloys other than stainless steel, the latter is by far the dominant. Considerable work is done also with stainless-clad mild steels and other laminated stock.

Indicative of the capacity for large deep drawings is that 11-gage stainless steel blanks 53½ in. in diameter have been drawn into shells 32 in. in diameter and 18 in. deep; also, 50-gal. containers 24 in. in diameter and 24 in. deep, drawn from stainless steel of 12 and 14 gage, are included in standard lines. Work of this type is done mostly in a Bliss-Toledo double acting toggle press of 1200 tons capacity and some of almost equal size in a Bliss double acting hydraulic press of 250 tons capacity. Supplementing these are numerous other presses of smaller size in which drawn parts down to only a few inches in diameter are handled. These are supplemented also by spinning lathes, as well as by polishing, welding and other machines necessary for turning out finished products. All dies and other tools required are made in a tool room well equipped for the purpose.

Most of the sheet stock used is a deep drawing grade of 18-8 stainless steel purchased in white pickled finish. When production requirements warrant, blanking dies are used to cut out the blanks, but often, especially for short runs, shears are used to trim square sheets into approximately cir-

cular or other shapes suitable for drawing. Every effort is made, of course, to minimize scrap. Although some alloy iron dies are used for drawing when runs are short, and more expensive dies are not justified, a large proportion of production is with alloy steel dies.

Naturally, the number of drawing operations per piece depends upon the depth and shape of piece required, among other factors, but accompanying illustrations give an idea as to the successive steps in certain large pieces. One of these is a bowl for a dough mixing machine in which four drawing operations are required to convert a 49-in. blank of 14-gage 18-8 stainless steel into a bowl 24 5/32 in. in diameter and 22½ in. deep. Such deep drawn parts are produced in a large range of sizes, from 10 to 150 quarts, and sometimes the dimensional limits are so close that subsequent spinning, as later described, is required to true the diameter, as well as to form a bead at the rim. Another type of part produced in considerable quantities and in several sizes is the shell for carbonating gas used in soda fountains. All of these shells are made from 18-8 stainless steel (much of it 13 gage) and all have a flange punched with bolt holes for attachment to the cover portion. Such shells must withstand a test at about 400 lb. per sq. in. internal pressure before they are passed for

service. An illustration shows a shell of this type in the various steps of drawing from a blank of $25\frac{1}{2}$ in. diameter (13 gage stock) to a shell measuring 10 in. in inside diameter and 12 in. deep.

The drawing operations on a part such as that last mentioned are made at a rate which averages, for a single draw, around 125 per hour, once the dies are set up. Severe draws of this nature involve applying an unusually heavy or semi-solid lubricant, but lighter draws commonly can be made with a heavy soap and water solution as a lubricant. After each drawing operation, the parts are promptly toted to the annealing department where they are washed free of lubricant in a hot soda solution and then are wiped dry with clean cloths, as otherwise the lubricant will be burned into the metal during annealing, resulting in pitting.

Annealing is carried out in oil-fired ovens in which, at present, no effort is

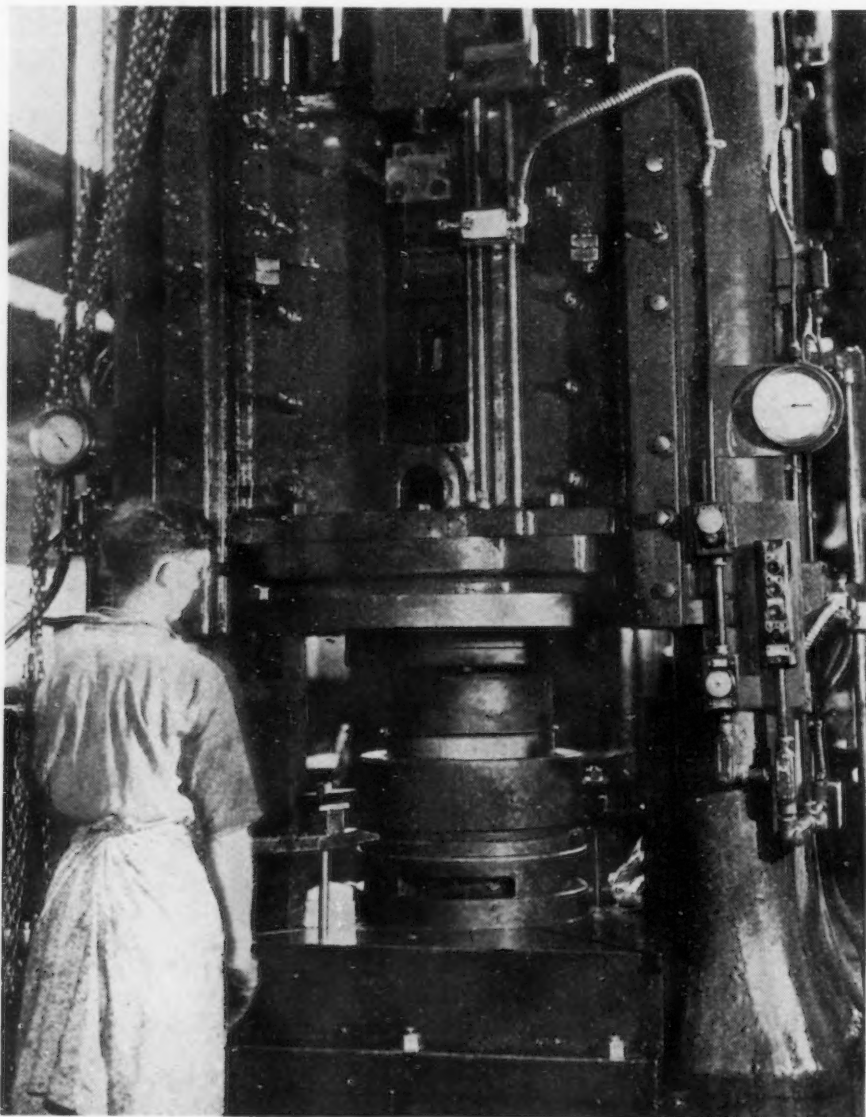
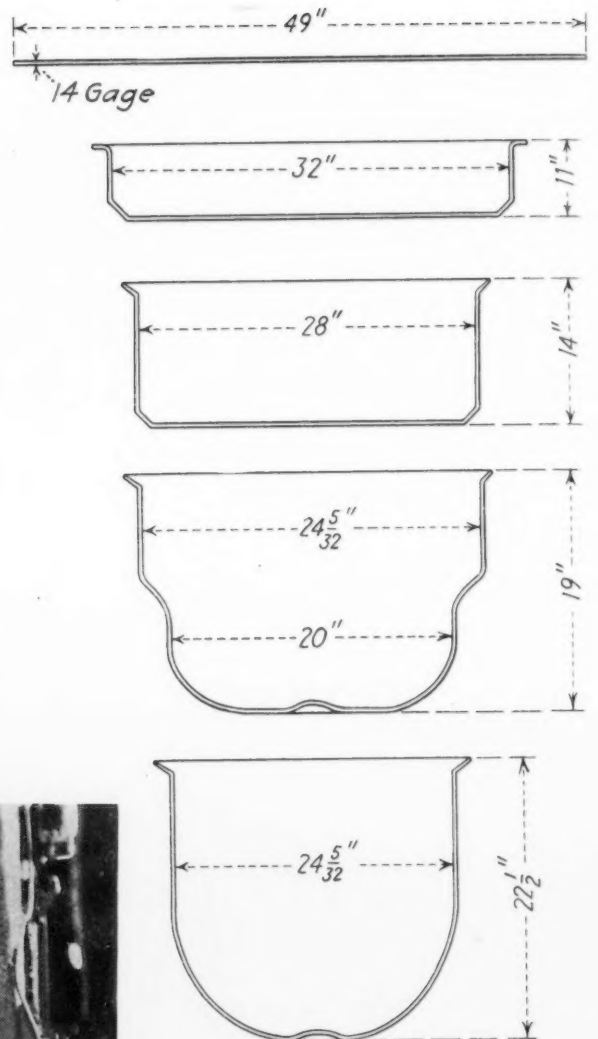
AT RIGHT

SKETCH showing the successive steps in drawing a 24-in. mixer bowl from a 49-in. blank of 14-gage stainless steel. In subsequent spinning the piece is accurately sized and a bead formed on top edge.

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BELOW

Intermediate operation in drawing a large stainless steel mixer bowl in a Bliss hydraulic press.



made to control the atmosphere, but each oven is provided with a pyrometer and the temperature is so regulated that the parts will be annealed for 3 to 5 min. at 1950 deg. F., the precise time depending largely on the gage of metal being worked. Enough time is allowed, of course, for the parts to attain the annealing temperature and to soak at this temperature to effect the required softening. Besides relieving the drawing stresses (which otherwise may result in spontaneous cracking of the piece), annealing makes possible further drawing during which, of course, the metal again is work hardened and must be annealed again.

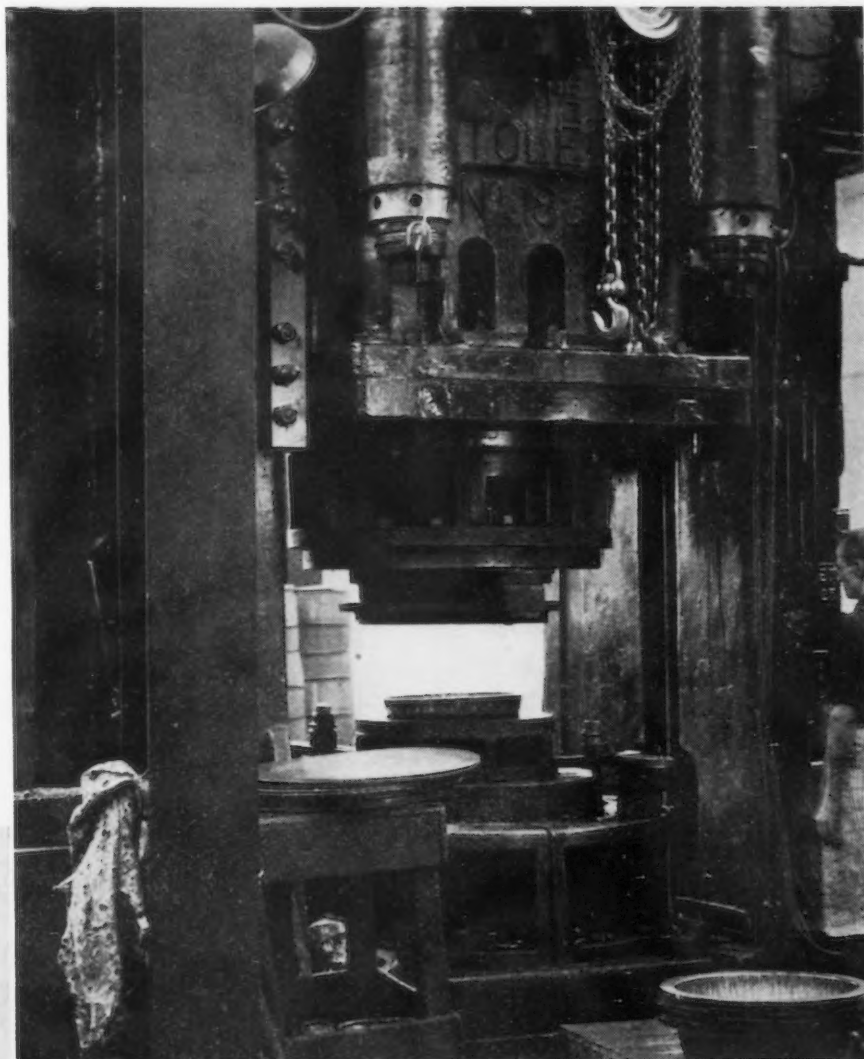
Work to be annealed is first loaded on a grate which is set on a pair of rails forming part of a lift or carrier mounted for rotation about a vertical column. When ready for the furnace, the load with the carrier is shifted by turning the latter through 180 deg. to bring the load in line with the oven door. When the latter is open, an electrically operated carrier picks up the load, transfers it on a track into

the oven and lowers it onto supports so that the lift can be withdrawn. While annealing is progressing, another load is prepared on the free side of the rack. When a charge is sufficiently annealed, the oven is again opened and the lift withdraws the load and lowers it, still on grate bars, onto the rotating carrier. The latter is again turned about, bringing the new load in line with the oven into which it is immediately transferred. While annealing proceeds, the prior load is allowed to cool, by natural radiation to the air, until the load can be handled. Then a new one placed on the grate bars, and the cycle, which averages around 10 min., is repeated. As the size and gage of parts vary con-

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BELOW

CARBONATOR shell, showing the successive stages of drawing from blank to final shape. Annealing is required between each operation.



FIRST drawing operation in a Toledo toggle press on stainless steel blanks for carbonator shells.

o o o

stantly with the variety of work going through, manual control of handling meets conditions well. The foregoing applies primarily to the oven shown in an accompanying illustration, but the same procedure is used in another oven for smaller and lighter work except that a manually operated lift is substituted for the electrical type needed for heavy work.

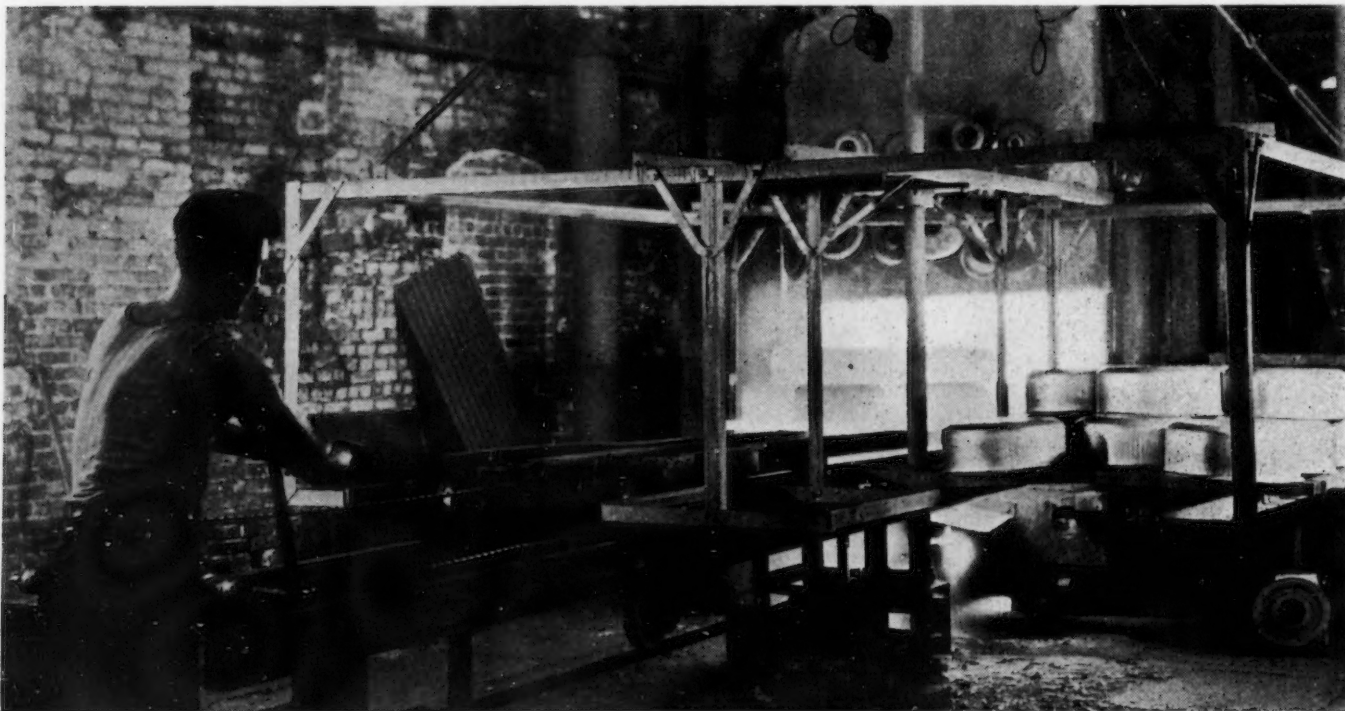
Subsequent to annealing, parts which require further drawing or spinning are pickled, as a rule, especially when close tolerances must be maintained, but some work is handled successfully without pickling between operations. Pickling is done in tanks lined with carbon brick, which brick resists the exceedingly potent mixture of nitric and hydrofluoric acid required for scale removal. The pickle is heated to 160-170 deg. F. and pickling takes from 10 to 12 min. in an average

case. Upon completion of pickling, the parts are transferred to a washing tank where acid is rinsed off and operators use sand to loosen and remove any remaining scale, after which the parts are loaded on trucks and are toted to the next operation. Except when the number of parts produced per run is extremely large, each operation on the whole batch is usually completed before the next operation is undertaken, hence there is usually

Spinning Operations

Although a large proportion of drawn parts are composed of circular sections, the circles are not likely to be perfectly true and some draft is required to facilitate removal from the punch. For this reason, it is sometimes necessary, especially if close dimensions are to be held, to perform some spinning operation to true the diameter and/or to remove taper, the

headstock spindle. The tailstock usually carries a cup or socket designed to rotate with the work and to hold same on the chuck tightly enough to be driven by friction between the work and the chuck. The spinning tools are carried in suitable rests on the lathe carriage and can be traversed, when required, both along the ways of the bed and transversely thereto. Often the tools are given a combined longitudinal and transverse motion



OVEN and handling equipment used in annealing stainless steel parts between draws. A charge at red heat is just being withdrawn from the oven. Another charge, ready to be placed in the oven, is on the carrier at the right, which will be swung through 180 deg. as soon as the charge being withdrawn is lowered onto the carrier.

some temporary storage of parts at convenient locations between operations, the plant having ample space to permit this.

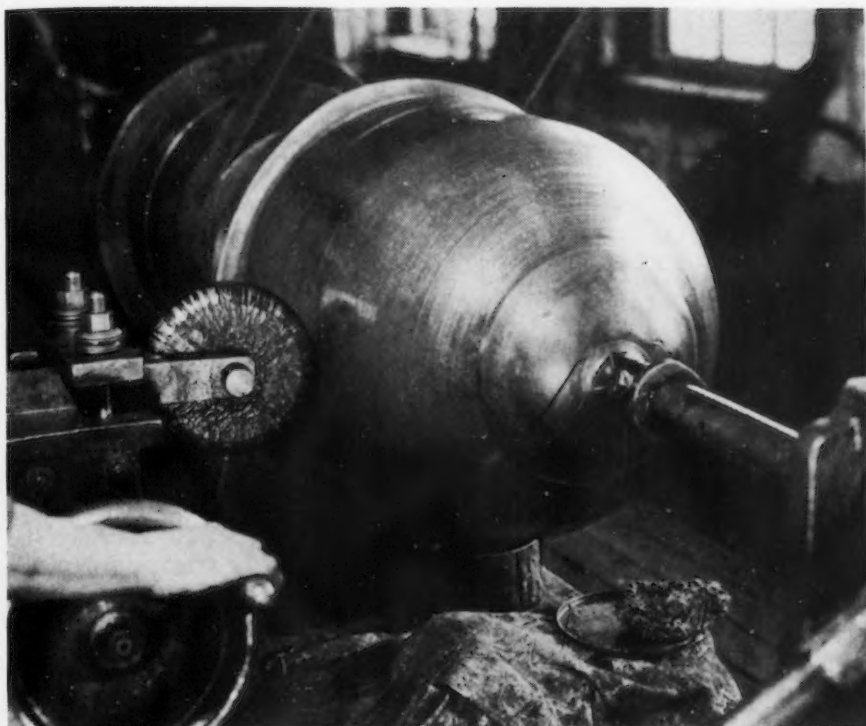
In general, parts remain in the press rooms or in the department where annealing and pickling are done until all press work is completed. This sometimes includes, besides drawing operations, such work as trimming or punching of flanges unless the trimming can be done to better advantage in the spinning department. Trim dies are not always justified because of the moderate quantities handled and because the work must often be sent to the spinning department anyway for beading and other work. Naturally, only circular or elliptical products lend themselves to trimming in a spinning lathe.

latter applying to pieces intended to be truly cylindrical. Forming of drawn parts on a spinning lathe is often required to neck certain portions and/or to provide flanges of special shape and to turn over beads. Some such work could be done in forming dies, and bulbous portions are sometimes formed by using rubber or some equivalent expanding medium as a punch in a press, but, in general, die costs for such work are too great to be justified by the quantities required, hence the resort to spinning.

Spinning of drawn parts is done on lathes made especially for this purpose and the same lathe is sometimes used also for trimming flash at the lip or the edge of flanges. In all cases, the work to be spun is mounted on a chuck shaped to fit it and is carried on the

necessary to follow an irregular surface. Nearly all spinning tools used rotate with the work, being driven by it as it rotates, and considerable skill is required to cause the metal to flow as desired, as a result of the spinning action.

Spinning can be done on an outside diameter, in which case both the outside and inside diameters are usually decreased, or on an inside diameter in which the latter as well as the outside diameter is increased. A combination of tools may be used to "pick up" (throw outward) a flange and then to form the flange into a bead. These operations, termed "beading," are performed to provide both a stiffening and a finish at the rim or lip of the drawn part. Such beads usually have a circular section and sometimes in-



SPINNING a large stainless steel mixer bowl to true the diameter and the rounded bottom after the part has been drawn to approximate size in several press operations. The rounded edge wheel on the tool rest of the lathe carriage applies sufficient pressure to effect the spinning action required. A sponge is used to apply lubricant.

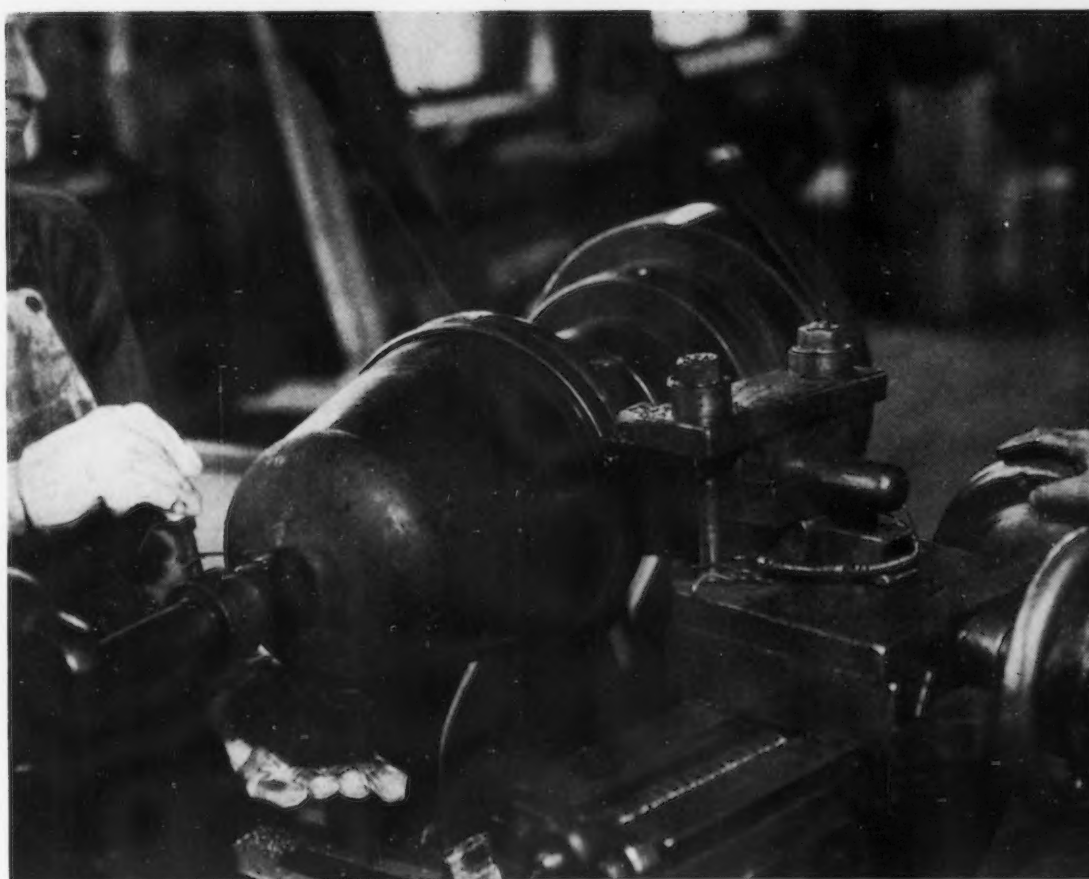
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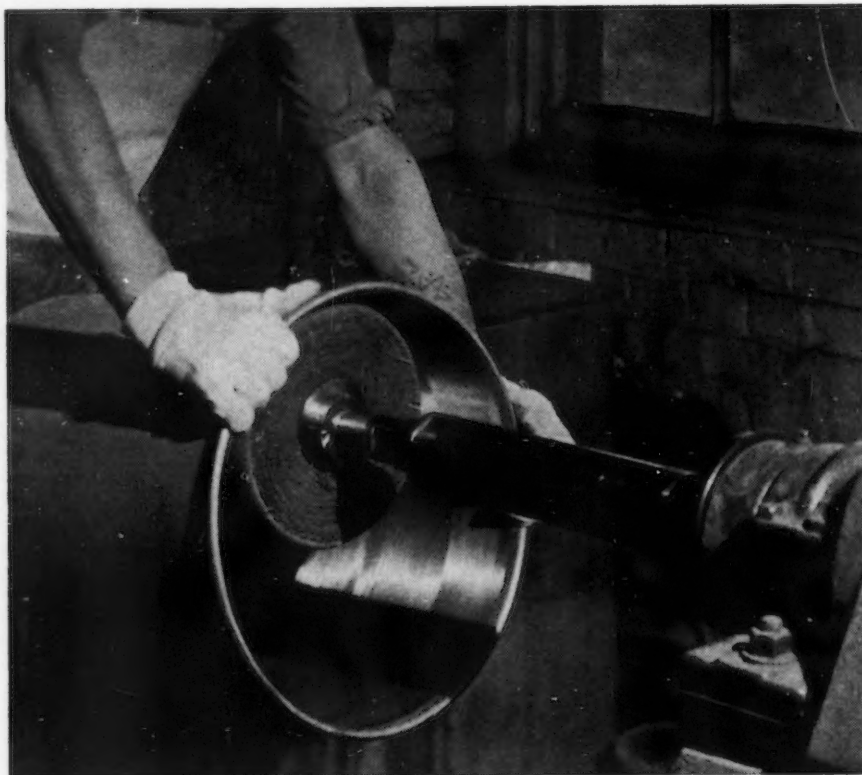
clude an inserted wire, but in other cases are flattened after being formed circular initially.

When the interior of a drawn part is to be sized accurately by spinning or is to be necked at some portion, the spinning usually starts with a piece drawn to approximately cylindrical shape or perhaps of conical shape. When thus drawn and transferred, after annealing, to the spinning lathe, the work is first fitted over an accurately sized mandrel or chuck and it is the rolling of the work between this mandrel and the spinning tool which causes the metal to flow and fit the mandrel closely. If the spinning forms a neck, it is necessary, of course, to provide a chuck with a corresponding recess and to make it in sections so that it can be removed after the neck is spun in. Usually, a pair of sectional chucks are made, so that a helper can remove one chuck while the spinner is using the one on which the helper is not working. If the chuck be truly cylindrical, spinning sometimes causes the work to stick to the chuck and the spinning tool, which is initially fed from the closed or tail-stock end toward the opposite end, may have to be fed again in the reverse direction to force the piece off,

SPINNING a bead on the lip of a bucket shaped deep drawn stainless steel container. Two rotating tools are mounted to turn on a spindle in the tool rest. One roller has a sharp edge which "picks up" enough metal to form a flange, after which another roll, having a rounded groove, spins the metal over to form the bead.

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POLISHING the interior of a 50-gal. container which has been drawn from stainless steel sheet. The polishing wheel is carried on a 3-in. spindle, as it must have a long overhang to reach to the bottom of the container and not bend under the pressure applied.

hardening of stainless steel and the latter must sometimes be annealed prior to spinning. If the spinning be severe annealing after spinning may be required to relieve internal stresses. When a large change in diameter is affected by the spinning, as in necking a milk can, more than one annealing may be necessary, in which case the mandrel may be provided with a collar down to which the spinning (forming) proceeds in the first step. For the second step, the collar is removed, exposing a smaller diameter and providing a metal surface against which the final spinning is done and the neck is given the required final size.

Whether the product be only drawn or drawn and spun, polishing is always necessary to remove tool marks and to remove surface imperfections if the article be one in which such blemishes are objectionable. This is true of nearly all articles produced from stainless steel in this plant, hence extensive provisions for polishing are provided. Polishing is also required to remove blemishes where handles are welded in place or other welds are required. At present, all polishing is done mechanically. Electro-polishing has been tried and is still under investigation, but to

after the tailstock spindle has been backed away.

Spinning tools usually have crowned faces and are pressed against external faces with sufficient force to produce the required deformation of the metal between the tool and the mandrel. Sometimes this forms a "thread" or helical mark on the work and this must be removed in some subsequent operation if the exterior must be smooth. Roller tools for "picking up" a flange have a V-shaped edge which is fed in between the mandrel and the work, forcing the edge of the work outward, after which a roller tool with a rounded groove may be used to roll the flange backward and form a bead. Or, if required, the edge of the flange can be spun downward so as to form, for example, a return flange with one leg parallel to the cylindrical portion of the drawn piece. Some accompanying illustrations show spinning in progress and give an idea as to some types of tools used.

Besides producing a spinning action causing the metal to flow, the spinning tool trues the surface in contact with the mandrel and thus facilitates holding closer dimensions on inside diameters than are feasible in drawing only. Spinning, of course, results in work



THIS table, rotating on a vertical spindle, drives the container while the flat bottom of the latter is being polished with abrasive cloth pressed against the bottom by a wooden strut carried in a socket formed in the downwardly projecting arm of the lever.

date the results secured are considered much inferior to those gained by mechanical polishing, partly because of the frosted appearance of the article and partly because, as yet practiced experimentally, tool marks are not removed and even appear to be accentuated.

Nearly all polishing is now done with stitched muslin wheels to which the abrasive used is applied by conventional gluing methods. Most polishing is done on grinding machines built in the plant because much of the work is quite heavy and demands larger spindles with greater overhang (to reach into deeply drawn parts) than are (or were) available when the machines were built. Many of these machines have shafts 3 in. in diameter, some of which have the wheel 30 in. or more from the Timken bearings in which the shafts turn at 3000 r.p.m. For inside work, wheels of about 6 in. diameter or smaller are commonly used. The work is guided by hand and requires the application of considerable pressure to secure the polish desired. At the start, No. 100 grit is

used and then, successively, finer grits down to No. 200 for final-grinding. This results in a fine grain, satin-like finish pleasing to the eye and one which is not only resistant to all food acids but insures that no metallic taint or odor is imparted to foods which come into contact with the surface.

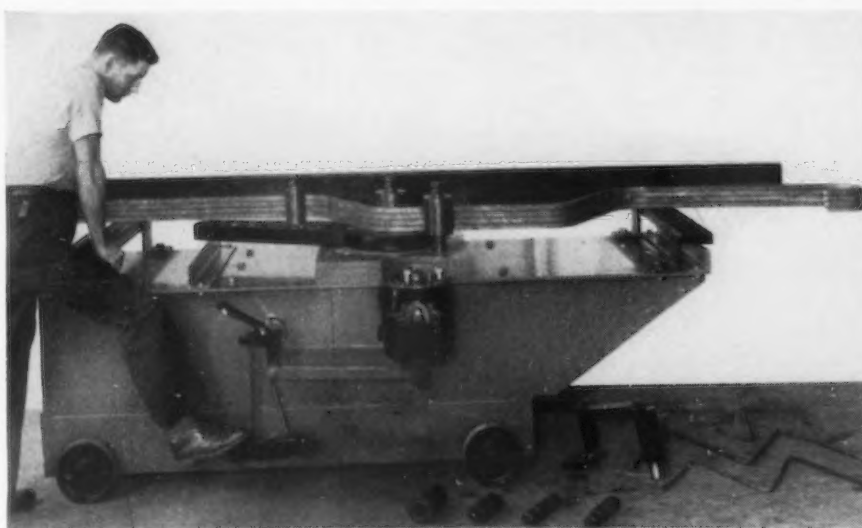
The foregoing grinding practice is followed on all interior and exterior surfaces which can be reached readily with wheels of the type mentioned, but is not adapted to polishing the inside flat bottoms of deep drawn parts. For these surfaces a special form of grinding machine is used, having a flat table rotating about a vertical axis. Grinding is done with grit papers or cloth folded and pressed against the bottom surface by a strut or wooden peg fastened in a socket on a lever, and long enough to reach to the bottom of the utensil or other product having the flat bottom to be polished. As shown in one illustration, the lever has a fulcrum at one end and a long handle to which the operator applies the required pressure to the abrasive,

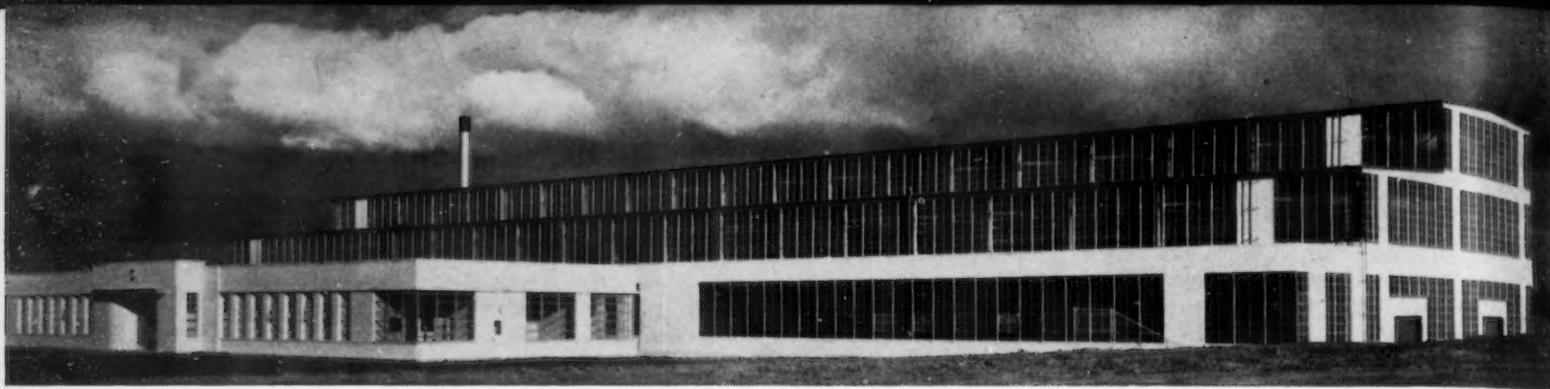
which is under the end of the strut, as the work is rotated. The abrasive is made to bear successively at varying diameters, by shifting the lever, until the entire surface is ground. Different grades of abrasives are used, of course, with the finest for final polishing.

Since polishing with abrasives in this manner yields a finish entirely satisfactory for the products made from stainless steel, there is no occasion to follow it, as a rule, by buffing. The latter can be done if required, but is expensive in that it is rather difficult on stainless steel. On the other hand, there is no need for protecting the satin-like luster resulting from polishing with a lacquer or other applied finish, because the finish is enduring, does not tarnish noticeably and, under normal conditions of service, is not subject to rusting. The final product, though not low in cost, is, of course, highly enduring and capable of trouble-free service over periods so long as to fully justify the higher prices which it commands.

Reinforcing Bar Bending Machine

AN automatic reinforcing bar bending machine, capable of bending two angles in one operation, has been introduced by G. D. S. Machinery & Supply Co., 101 Walker Street, New York. The unit will make all bends ordinarily required in reinforcing work and will handle plain, deformed, twisted and Isteg bars. Two sizes are available with capacities up to 2¼ in. in round bars and 2 in. in square bars. When bendings are made bars move across the machine in one direction and it is never necessary to reverse the bars. Bending operations are automatically controlled by index plates and dials which make it possible to duplicate bends accurately. Several bars can be accommodated at each operation. Equipment for producing spirals is also available.





THE new integrated plant where Hydraulic Press Mfg. Co. is now producing high-speed self-contained presses important in the national defense picture because of their widespread use in the manufacture of aircraft and automotive parts, shell casings, etc. Continuous bands of sash enclose the manufacturing area where intermediate and high craneway aisles are arranged in a stepped sequence behind a trim office building and low machine shop area.

H-P-M Opens New

BACK in 1877 the Hydraulic Press Mfg. Co. began in a small way to manufacture hydraulic cider presses in the small village of Mount Gilead, Ohio. Shortly after the turn of the century the organization came under the leadership of the late Frank B. MacMillin and under his guidance wider fields were explored for the use of hydraulic presses so that today H-P-M presses are found throughout the metal working industry and also in the chemical processing industry. During the 1920's under the direction of Howard F. MacMillin, now president of the company, and Walter Ernst, chief engineer, H-P-M introduced numerous improvements which have received wide acceptance in a variety of industries both in and outside the metal working field. In 1927 the company developed a new method of press operation and control which made practical the widespread use of hydraulic presses for mass production in the metal working industry. Previous to this time, hydraulic presses were manually operated and slow in action compared with mechanical presses, factors that limited their application in industry where fast operations were essential. The new method involved the use of the

so-called closed circuit high speed system of operation, utilizing an oil powered, self-contained radial pump in which the reversal of the ram was obtained by reversing the output of the pump without the use of valves. This basic method of operation and control, together with an improved radial pressure generator subsequently designed by the company now goes under the name of the H-P-M Fastraverse line of presses.

In 1934 the company began production of its own form of heavy duty radial type pressure generator and has subsequently added to its line of controls, valves and accessories. During 1939 a wholly owned subsidiary, Hydro-Power Systems, Inc., was formed for the purpose of selling such products to other machinery manufacturers and machine tool builders. During the last five years, the company also has designed and introduced a line of presses for the injection molding of plastics. It has also developed a triple action press for the deep drawing of sheet metal, opening up a new field of application for hydraulic presses, heretofore reserved only to mechanical type presses.

In connection with the development of presses for aircraft manufacture, the company has collaborated with Douglas Aircraft Co., Inc., in the ap-

plication of the so-called Guerin process of forming and blanking sheet metal, and has been appointed by Douglas as agents for the licensing of this process to manufacturers outside of the aircraft industry. The Guerin process (described in THE IRON AGE, issue of Oct. 26, 1939) consists in effect of forming, shearing or blanking sheet metal by using dies made of inexpensive boiler plate or even non-metallic substances like masonite, in conjunction with a large rubber pad in the punch holder.

It can be seen, therefore, that the present expansion movement cannot be assigned entirely to the pressure of producing machinery for defense purposes, although it comes at a time when hydraulic presses are in great demand by defense industries. As a matter of fact, the site of the new building, recently opened, was selected some time ago and the company announced plans for the expansion at least a year ago. One of the objects was to get more room to build much larger machines than had been possible in the old plant. In the process of moving, relatively few men have been added to the working force which has advanced from 250 to 300 men working in two shifts in both plants as compared with a year ago. What has largely occurred is that a great

*Photographs by courtesy of the Austin Co., designer and builder of the plant.

deal more room has been obtained for carrying on operations more effectively and much of the shop equipment has been modernized. It is expected that when the new plant is in full swing, the productive output will be at least 100 per cent above that of a year ago although only 35,000 sq. ft. of floor space has been added to the 95,000 sq. ft. still available in the old plant. About half of the \$600,000 investment that has gone into the plant expansion has been applied to the purchase of new machine tools, including

openside planer, a No. 2 miller, five turret lathes and four engine lathes. In addition, all old equipment transferred to the new plant was rebuilt and motorized to get away from the use of overhead lineshafts.

The plant is 400 ft. long, arranged in three bays of graduated size. The high and intermediate bays contain complete manufacturing facilities for building presses, the low bay to the front serving various secondary functions including storage of materials, tools, finished parts, shop offices, etc.

pump are still made at the old plant, as are the injection molding presses. Most of the castings used for the big presses are large steel castings, weighing as much as 175,000 lb. per unit. These first pass through the castings grinding room located at the northwest corner of the plant where they are cleaned while on the flat car with portable electric grinders before being brought into the large bay for unloading. Truck shipments of smaller castings and other raw material are received in the center aisle. All pre-

Plant at Mount Gilead

a number of engine lathes, turret lathes, horizontal boring mills, radial drills and one large planer that will accommodate work 10 ft. wide between housings and has a table travel of 20 ft.

The equipment modernization program did not begin when plans for the new building were initiated although the expansion move accelerated it. A number of new machines were bought in 1937, including a 5-ft. radial drill, 5-in. spindle horizontal boring mill and a precision boring machine for pump cylinders. Another program was started in 1939 and in the latter part of the year equipment for the new plant was being ordered. Altogether there has been added in the past year five radial drills ranging in size from 3 to 7 ft., a 4 and a 6-in. horizontal boring mill, universal grinder, heavy duty surface grinder, 36-in. hydraulic

The high bay is 55 ft. wide with a net clearance under the heavy crane hook of 36 ft. This bay is served by two 50-ton cranes which can be operated together for single heavy lifts. The intermediate bay is 40 ft. wide, with 22 ft. to the crane hook. It is served by two 15-ton cranes. All classes of work are carried out in the two production bays.

The new building is largely devoted to heavy equipment. Small components, such as valves, hydraulic fittings and the Hydro-Power radial

liminary work done on castings, steel plate and on other materials takes place at that end of the plant. From here the work progresses to the east end in one bay or another, depending upon the size and weight, through all of the various machining operations and on to the assembly department at the east end. The heaviest and tallest presses are obviously assembled in the large bay. The last 60 ft. of the entire east end of the plant is 4 ft. lower than the balance. The second railroad track enters the building from

o o o

GLASS and corrugated asbestos sheathing, which encloses the rear wall as well as the end walls of the Hydraulic Press Mfg. Co.'s new plant, can be easily removed and re-used in the event that expansion is found necessary. This view, which shows a portion of the overhead steel door at the receiving track, illustrates the extraordinary daylight areas in this plant.





ROUGH castings, some weighing up to 60 and 70 tons apiece, are finished on planers, boring mills and other machine tools at this end of the high crane-way aisle, where two 50-ton traveling cranes provide capacity for handling moving loads up to 100 tons. Concrete floors are of varying thickness and have inset areas of wood block to facilitate the safe handling and turning of press parts in manufacture. Unit heaters are suspended from the crane rail. Overhead bus ducts used for power distribution and other service facilities are nested along the line of columns between the two crane bays.

the rear at that lower level directly along the edge of the offset. This means that the building floor is level with the railroad car floor on one side, and this floor offset increases effective headroom under the cranes in both bays by 4 ft. In this area there are also two pits for the erection of presses that have hydraulic cushions located below the floor level.

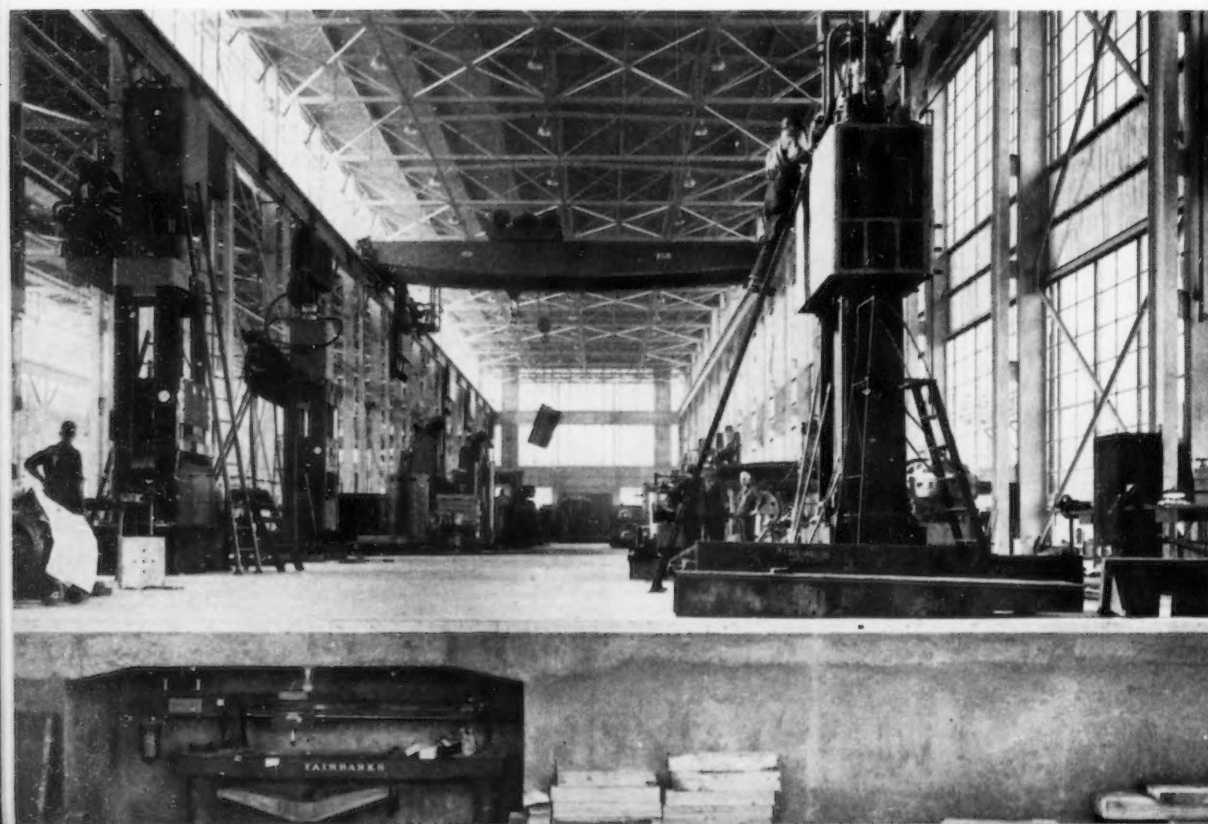
In the design of the building provision for future expansion has been made. The machine shop can be extended either way, and other low bays

can be added to the north. For this purpose, corrugated asbestos sheathing, which may be removed intact, is used on the north wall and high bay ends. Allowance also has been made on the outside of the north wall for a 15-ton, 40-ft. span crane to serve such a possible future bay.

The building itself is of steel frame construction in which a large amount of welding is incorporated. As can be seen, the glass occupies a large portion of the wall area. The sash of the south wall of the low bay is fitted with $\frac{1}{8}$ in. hammered Aklo glass

which gives practically north light conditions on the south side of the plant. This special blue glass is also used in the south monitors, and the west wall. The north wall, however, is fitted with clear glass and the east wall with hammered glass. The deck roof is made of 18-gage steel, a built-up roof covering over 1 in. of cork insulation.

Lighting has been designed to give 15 foot-candles illumination at the working level at night. In the high bays high intensity mercury lamps are alternated with incandescent lamps,



H-P-M FASTRAVERSE presses are being assembled in the foreground, at the east end of the main operating floor in the high crane-way aisle. This view, taken from the depressed area at the extreme east end of the plant, where test pits provide extra clearance for presses ranging up to 50 ft. high, shows the track scale recessed in the retaining wall. Box cars are loaded directly from the working floor.

o o o

NORTH light is admitted by the lofty clear glass enclosed wall of the high craneway aisle (right), while that from the south (left) is controlled by the use of Alko glass which reduces the infra red rays entering the plant, so that this lathe operator, who is finishing a press ram, works under ideal conditions.

o o o



whereas in the low bay or leanto, high intensity mercury lamps are used throughout. In this connection, it might be mentioned that H-P-M has been working on a two shift basis since 1935 and not long ago the shifts were increased from 8 to 10 hours a day in order to meet the increased demand for hydraulic presses.

Special facilities are incorporated for the handling of oil in large volumes used in the testing of all presses. A 5000-gal. two-compartment oil storage tank is located underground in that section. A system of oil pipe lines running to every building column in the assembly area provides means for filling any press by simply connecting

an oil hose to the nearest outlet. After the press has been tested the surge tank may be drained back into the oil system, returning by gravity to the second tank compartment. A centrifuge transfers the oil to the other compartment for re-use, removing all impurities and moisture.

The new H-P-M office building joins the plant at the front. This is a simple structure all on one floor measuring 180 ft. by 50 ft. It is connected with the plant at the rear through an enclosed passage. The interior arrangement provides general offices along the rear with private offices and conference rooms across the corridor along the front.

The new plant is located one mile west of the old, which will be continued in operation. The removal of most of the large equipment to the new plant has left considerable space which is now being used as an erection floor for the injection molding presses. Other equipment remaining for the manufacture of component parts, such as the Hydro-Power pump, will be rearranged when time permits. The actual removal and installation of the equipment in the new plant took place the latter part of August during normal 10-day vacation shut-down preceding Labor Day; thus there was practically no loss of time in the normal output of the plant.

o o o

FLAME cutters and welders work on one side at this end of the intermediate bay at the new H-P-M plant, where built-up bases are fabricated. Two 15-ton traveling cranes facilitate materials handling in this bay where most of the work on smaller presses is concentrated. Certain light machine operations, the production office, coat rooms and lavatories are located in the low bay on the right.

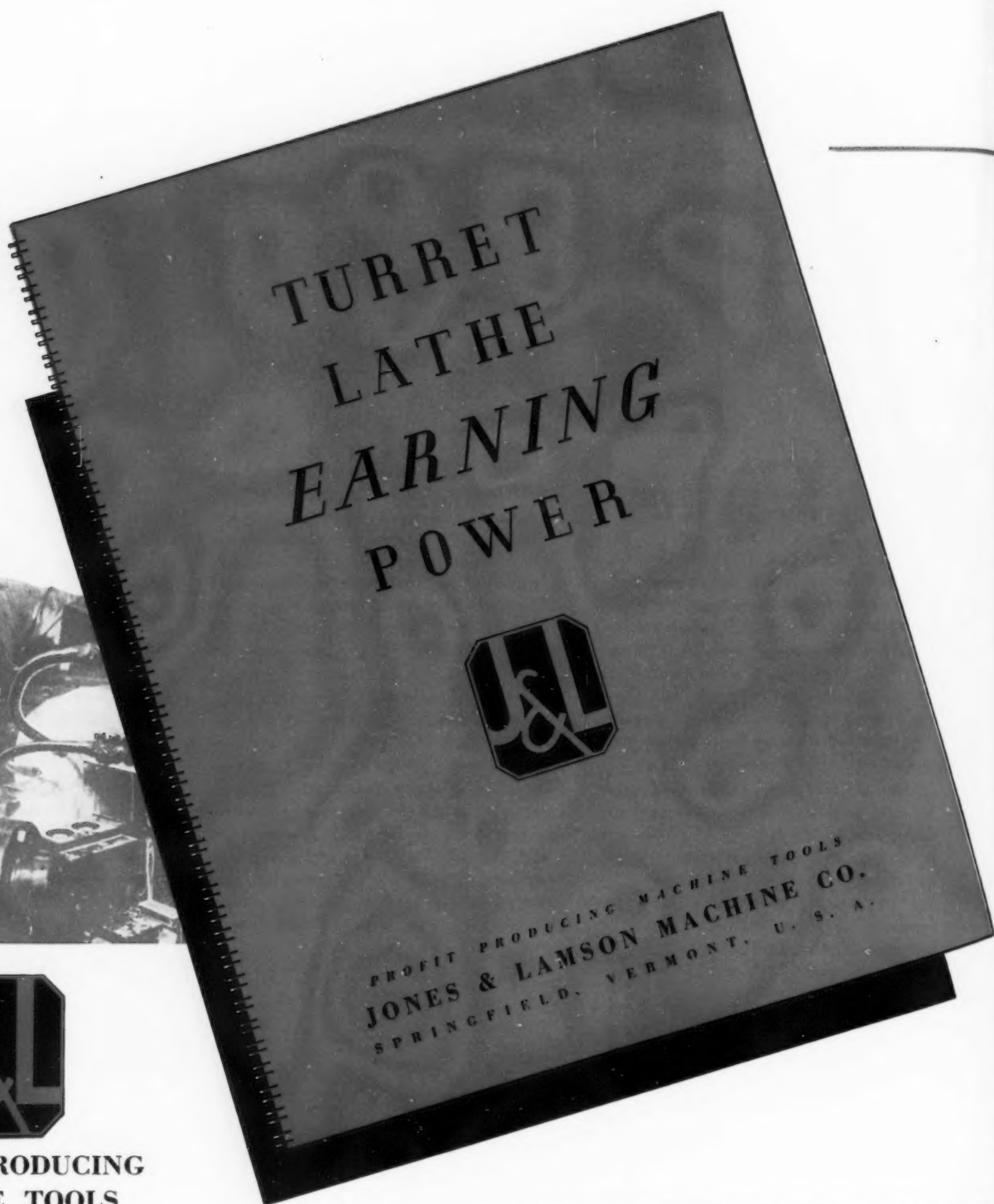
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I A

DETROIT — Attempts to predict automotive business trends for the period ahead are virtually impossible, although from every quarter requests come for some kind of forecast. The best that can be said now is that the industry itself is speculating, rather than predicting. Its speculations are admittedly unsatisfactory. Executives, even the top-most, reformulate their opinions each time they get a further bit of news about the part which the industry will play in the defense program.

While defense projects assigned to this area (approximately half a billion dollars for all U. S. projects prior to October 25) were being absorbed with little difficulty, the job of absorption was made difficult by the addition of the scheduled project involving 12,000 bombing planes and totaling another outright half-billion dollars. This airplane parts manufacturing order, the largest in the world, was casually doubled within two weeks with news that the British would add another 12,000 bombers.

It is obvious that any estimate on October 25, or shortly afterwards, and taking into account the 12,000 bombers, would have been thrown out when the bomber order was doubled. Estimates and predictions are out. Speculation and hoping are the order of the day.

There are plenty of things to speculate about. To some questions, answers are being sought through a study of the facts available; other questions await the answers that only time can give.

Production to Set Records

For instance, the basic philosophy of the automotive-aircraft program is that machinery available now in the automobile industry must be utilized in the airplane parts production without putting any further drain on the machine tool industry. Considering the amount of automotive plant equipment which is not adaptable to anything but current model automobiles, this is going to be a job of the first order. However, surveys of available equipment are being rushed to completion. Question No. 1 in the defense program is "How much of the present equipment can be used in plane production?"; question No. 2 is "How much will be left over for the building of automobiles?"

Similar questions involve available man-power, executive and technical talent, and materials. Partial answers are forthcoming, but no one has yet been able to gage the ultimate effects upon automobile production.

Production for the remaining weeks of this year will most certainly be in the highest brackets that the

On The Assembly Line

BY W. F. SHERMAN

Detroit Editor

• Auto production for remainder of 1940 to stay at record levels but heavy defense requirements cause Detroit to ponder . . . One question is extent present equipment can be used in plane manufacture

industry has ever seen. October output established a new record, and is estimated by the Automobile Manufacturers Association at 519,700 cars and trucks, more than 60,000 units above the best previous record for the month. Production already this year is in excess of the total for the entire 12 months of 1939 and is 27 per cent above last year's figure for the 10-month period. Despite a seasonal tendency downward in sales volume, there is little to indicate that either sales or production will fall off seriously before the end of the year. Output in excess of four-and-a-half-million for the calendar year seems probable.

Beyond Jan. 1, the industry's executives are not quite sure of the answers. More wages and purchasing power throughout the United

States should keep sales at a substantially higher level than in previous winters. Spring sales might be carried to record heights by the presence of a lot of purchasing power in the hands of consumers next Spring. This will undoubtedly induce manufacturers to carry heavier inventories of cars into the Spring selling season. "How large?" is an unanswered question.

Right now the industry, with few exceptions, finds its plants breaking daily and weekly production records. Last week in Detroit heavy wind storms tore down power lines and delayed production. Buick, for instance, lost about 1,200 final assemblies on Tuesday, which is reported to be equal to the output of two shifts working nine-and-a-half hours each. The Buick Fisher No. 1 plant and AC Spark Plug plants at Flint announced Wednesday that they would work on Saturday to make up the 1,200 assemblies.

Effects of Defense Program in Doubt

Used car sales are reported strong and, as usual, herein lies the clue to some of the answers. If back-to-work labor spends part of its pay checks for used car transportation it helps to keep the industry moving at a rapid pace. In that event, production for the remainder of the model year will continue to set records.

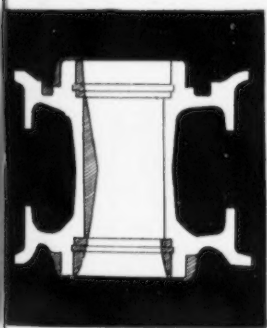
Ultimate effects of the defense program upon automobile production are in doubt. Facing the facts, however, it seems impossible to carry out the 24,000 bomber program without serious dislocations in the auto industry's normal activities. By this time next year (when the airplane parts production will be a reality) a very large portion of the stamping and forging facilities in this area will be unable to produce many automotive parts. Production of automobiles will suffer in consequence.

Serious consideration must be given to the prospect

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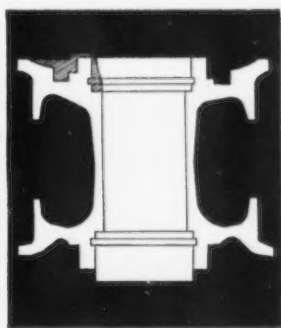
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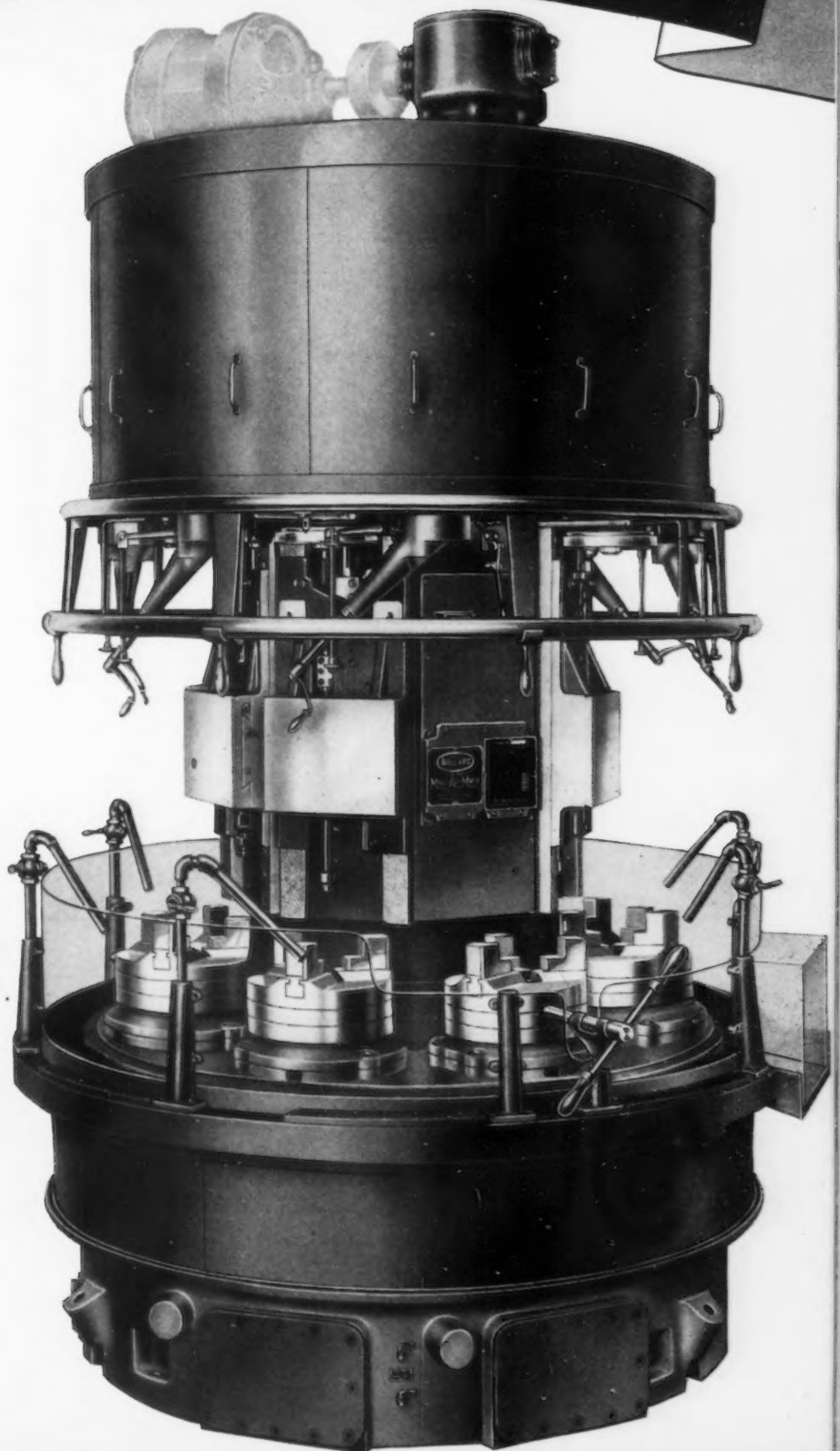
23 operations; bore, turn, sweep,
groove chamfer face, ream; Fin-
ishing 12 distinct surfaces.
R.P.M.'s at the 7 working sta-
tions range from 48 to 134; Cut-
ting speeds vary from 38 ft. per
min. to 140 ft. per min.; Feeds
from .0067" to .0508".



2ND CHUCKING

18 operations; turn, sweep,
groove bore, groove, face
chamfer ream; Finishing 11
distinct surfaces.
R.P.M.'s at the 7 working sta-
tions range from 48 to 103;
Cutting speeds vary from 38 ft.
per min. to 81 ft. per min.;
Feeds from .0096" to .0476".

The part, sketched in profile, is approxi-
mately 8" wide and 7" high; shaded
areas show surfaces finished in each
chucking.



THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

that the dislocations will be severe enough to interfere with the productivity of whatever plant equipment is left for automotive work. For instance, it may be possible to continue work making automobile engines and transmissions, because the specialized manufacturing equipment will not be disturbed—but it will be of little avail if the stamping plants cannot provide fenders, doors or bodies.

Regarding a supply of labor skilled enough to operate machines for production, there are two possibilities—all the available labor can be used up on the combined automotive and aircraft work in this area, or the concentration of skilled men in the aircraft work may be so great that the less skilled, left to the auto industry, will be unable to operate the automotive plants satisfactorily. Another way of looking at it is that interference with automobile manufacturing may throw men out of work who will not be able to find jobs in the aircraft program.

Displacements of this sort are possible, even though there is general agreement with the proposal by GM's Alfred P. Sloan that a return to working six days a week is a desirable first step in speeding up armament production. A parallel proposal for increased production was made here several weeks ago by a parts manufacturer who said that his stamping plant equipment would have to operate on three shifts and six days a week to handle airplane parts production

in addition to automobile stamping work.

This new auto-aviation program still depends upon the action of Congress, which must provide the funds and authorization. It is stated that the proposed legislation for the Army's block of 12,000 or more bombers still is in the hands of the budget bureau, and no appropriation will be forthcoming for some time, possibly after Congress meets in January. In the interval there is a great deal of preliminary work to be done in lining up sources of supply and of manufacture. Besides, this, the bombing plane designs are not standardized or completely approved yet.

The two new aircraft assembly plants, supposedly to be built by the government but operated by private industry, will be erected in the Middle-West. One of them is slated for the vicinity of Detroit.

Hundreds of automotive executives and engineers have visited the headquarters of the automotive committee for air defense in the Graham-Paige plant here and have been shown sample parts specifically made for the bombers in question to study.

Labor Discord at Briggs

In the new Briggs aviation plant, which already is engaged in airplane metal parts sub-contracting, there are rumblings of union labor discord. The CIO is nursing an old wound which has its origin in a split between veteran Briggs' workers and newer men. Veterans of 10

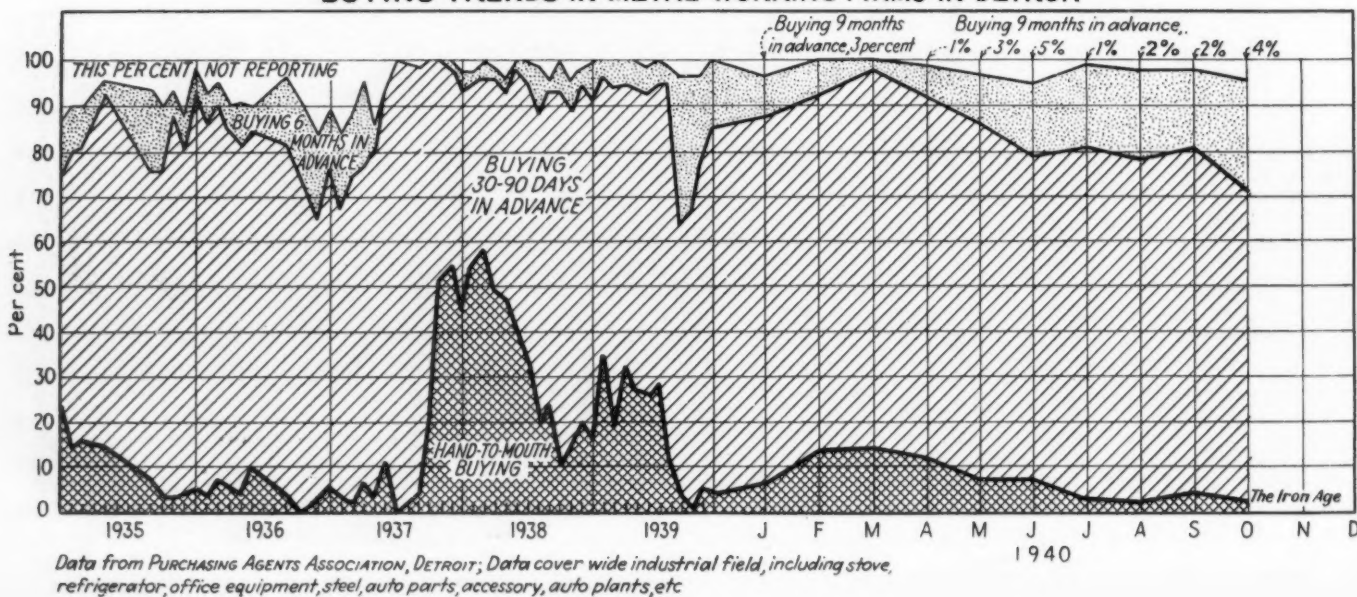
years or more in the Highland Park plant did not receive CIO organizers with any great display of welcome when they tried to form a local there about three years ago, although eventually the Highland Park plant was organized. Meanwhile, younger workers in newer Briggs plants took the lead in CIO activity and eventually were successful in their efforts to have job-seniority placed on a plant basis rather than a company-wide basis. When Briggs lost the Ford body contract, upon which the work was done in the Highland Park plant, the veterans found themselves without work to do in their departments and without seniority which would permit transfer to other plants owned by Briggs. Starting a brand-new airplane division in a new plant, Briggs drew upon its veterans for the backbone of the staff, thus the dissatisfaction of the CIO.

Other Trouble Spots

In addition, in CIO circles there is talk of asking for \$1.20 an hour on aircraft work because of the special skill required.

This is only one of the possible labor sore spots which can be foreseen now. The drive on Ford to reorganize Ford workers has received new impetus with a collection of a \$100,000 campaign fund from UAW and CIO men. Observers see the Lincoln plant—small and separate from the rest of the Ford empire—as another possible trouble spot.

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WASHINGTON — Whether the government can maintain a treble damage suit under the Sherman anti-trust law will be determined by the Supreme Court when it hands down a decision in the case involving 17 rubber tire manufacturers who are alleged by the government to have conspired to fix prices "identical to the penny."

Representing the first time in the 50 years of the act's existence that the government has claimed this punitive right, the case takes on added importance in view of large-scale government purchases under the national defense program, and because of the complaint against identical bidding frequently registered by various government agencies.

Attorneys for the companies involved were quoted as saying that the litigation does not affect the right to punish violators of the anti-trust law by means of fine, imprisonment or injunction, but whether triple damages can be secured in addition.

A Federal Circuit Court in New York previously dismissed the suit to collect \$1,053,474 in triple damages from the tire manufacturers, holding that the Federal Government was not a "person" and was therefore not entitled to recover treble damages. Specifically, the circuit court held that the provisions of the Sherman Act permitting any "person" to sue for treble damages resulting from conspiracies which restrain interstate commerce, did not apply to the government.

The Supreme Court agreed on Nov. 12 to review the case.

When identical bids were received by the Treasury Department's procurement division sometime ago, the bids were thrown overboard and the government contracted to buy its tires from Sears, Roebuck & Co. On this basis, the counsel for the tire manufacturers raised the question of whether the government suffered any loss as a result.

Not Blow at Basing System

Contrary to a rather common impression, it is not believed that the Department of Justice is striking at the basing point system in this proceeding. At the same time it is difficult to understand the reasoning of Solicitor-General Biddle that identical bidding takes on added importance because of the defense program. The question does have added importance because of that program but, it would seem, in a direction quite opposite to that Mr. Biddle has in mind.

Mr. Biddle would abolish what he calls identical bidding. Assuming such bidding is the result of con-



• Government's action to collect treble damages in price-fixing suit—important because of defense purchasing—to go to Supreme Court . . . Barring of identical prices seen as in conflict with negotiated contract law

spiracy, there is no doubt such bidding is a violation of the Sherman law. On the other hand, identical delivered prices certainly are not prima facie evidence of conspiracy. Given similar base prices plus equalized freight charges, like prices result, with the sharpest sort of competition prevailing.

But passing by either of these points, the fact remains that if identical prices were barred as proposed by Mr. Biddle, the Department of Justice policy would be in direct conflict with the negotiated contract law inspired by the national defense program. The National Defense Advisory Commission has established definite principles under that law and they have been approved by the President.

The commission on Sept. 6 in its general principles governing the

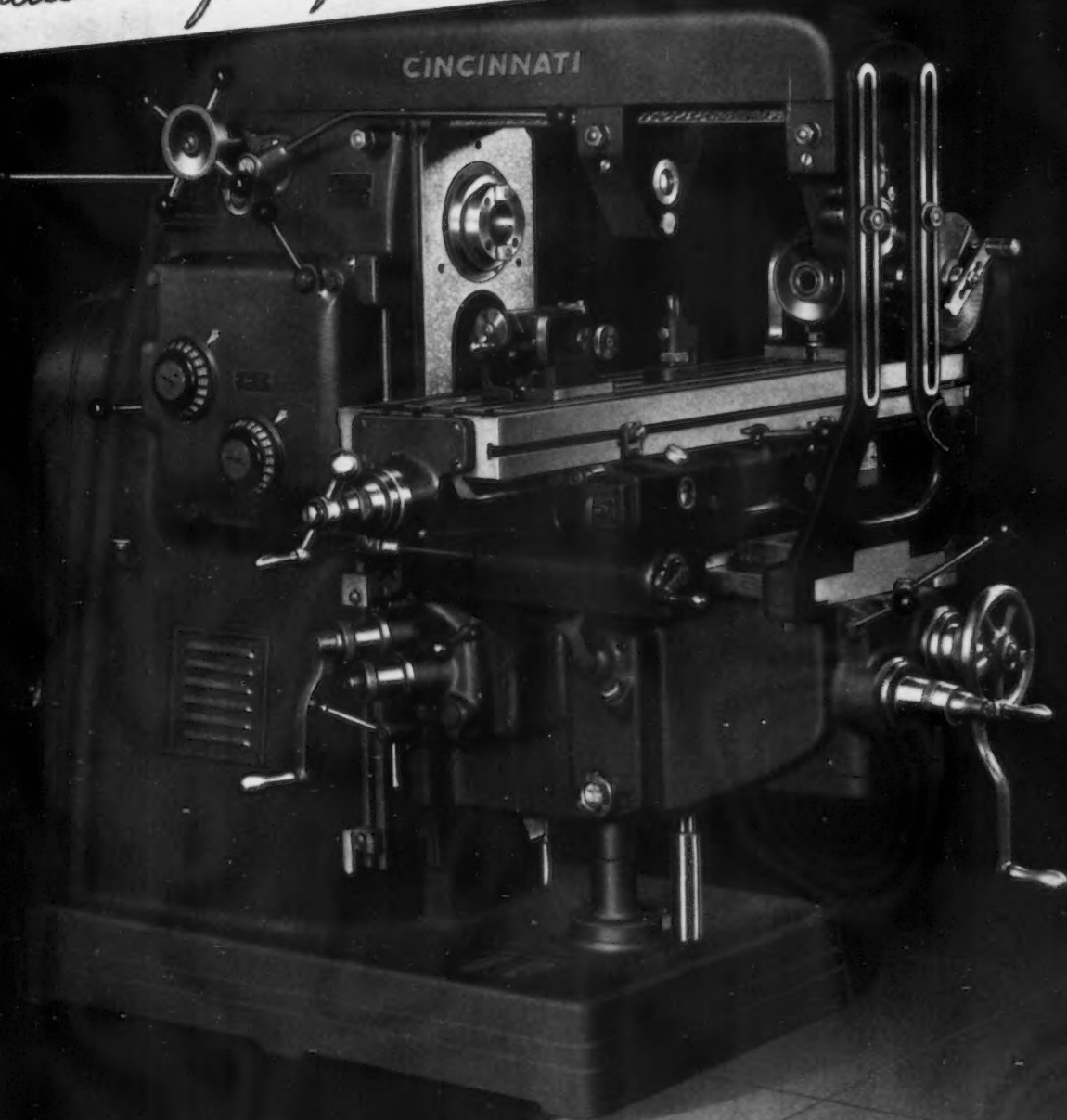
letting of defense contracts pointed out that the essence of the preparedness program is the getting of an adequate supply of materials of the proper quality in the shortest space of time possible. It specifically declared that considerations of price alone are highly important, but in the emergency are not governing. The commission went on to say that competitive bidding is the better procedure in certain types of industry and circumstances. It added:

"However, it is often impossible to make sure that the principles . . . are followed when contracts are placed on the basis of price alone and are let to the lowest bidder. Therefore, in cases where competitive bidding will not fulfill the . . . needs of national defense, the commission recommends the use of the negotiated contract be authorized where necessary in order that these objectives be obtained in making defense purchases."

Negotiated Contracts

The upshot of this law and policy is that vast quantities of supplies of defense requirements of all kinds are purchased under negotiated contracts, from battleships to sealing wax. Awards running into hundreds of millions of dollars are made at identical prices. The War or Navy Department may go to a single producer and negotiate a contract with him at any agreed price—and the government can see to it under the law that the price is reasonable. Or the government can take bids under the negotiated contract law. The bids are not opened publicly. Awards can be at any prices bid, high, low or medium, or all three. Or the government, finding an attractive price by a given bidder, can give him an award and then negotiate, as is commonly done, with other bidders, to reduce their bids to an identical level. One can imagine the disastrous

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effect—not a beneficial one as the Department of Justice assumes—that there would be on the defense program if, flying in the face of the negotiated contract law, it barred identical prices.

Washington

• • • The new team of Emerson, Hawes and Witt—three key members on the staff of the National Labor Relations Board—last week voted to disestablish themselves from the NLRB in protest against President Roosevelt's failure to reappoint J. Warren Madden to the board. Instead Mr. Roosevelt named Harry A. Millis, Chicago educator and former member of the old National Labor Board.

Thomas Emerson, associate general counsel; Alexander B. Hawes, chief administrative examiner; and Nathan Witt, board secretary, advised the board that since the President declined to reappoint Mr. Madden they were tendering their resignations. Their action followed by only a few weeks the dismissal of David A. Saposs, who headed the NLRB's division of economic research—the division which was

abolished under Congressional pressure. Both Mr. Saposs and Mr. Witt had been the subject of inquiry by the special House committee investigating the labor board.

Dr. Millis, 67, is a native of Paoli, Ind., and has spent most of his life as an economist and educator, having taught successively at the Universities of Arkansas, Stanford, Kansas and Chicago. Engaged recently in a collective bargaining study for the Twentieth Century Fund, Dr. Millis also was chosen several weeks ago by joint action of the General Motors Corp. and the CIO's United Automobile Workers as impartial arbiter under a new union contract.

In some quarters the President's action was taken to mean that the complexion of the board would be drastically changed by the new appointment, the expectation being that the new appointee would work closely with Board Member William M. Leiserson. It was Dr. Leiserson who was appointed by the White House sometime ago to do a housecleaning job on the board, but he was unsuccessful in his efforts to oust Mr. Witt. The other board member is Edwin S. Smith.

Leiserson, Millis and Smith, by

virtue of the President's latest attempt to meet widespread opposition directed against the NLRB's maladministration of the Wagner Act, may be in a position now to go ahead with a revision of labor board policies. Following the expiration of Mr. Madden's term, the board is understood to have reached a virtual stalemate putting the agency months behind in its work, due to the inability of Dr. Leiserson and Mr. Smith to agree.

President Roosevelt's selection of Dr. Millis was made public at a time when both AFL and CIO annual conventions were getting under way. CIO Generalissimo John L. Lewis, whose bitter anti-third term attack against President Roosevelt was made a few days before the Nov. 5 election, was strongly backing the reappointment of Mr. Madden. On the other hand AFL President William Green, who called the Millis appointment "perfectly acceptable," had openly condemned the NLRB chairman.

Meanwhile Mr. Madden was not left out in the cold. He remains on the Government payroll as a judge of the United States Court of Claims—a \$12,500 post in contrast to the \$10,000-a-year salary he was getting as a member of the labor board.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Washington

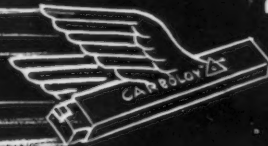
• • • The Labor Department's Conciliation Service reported last week that during October it disposed of 35 disputes, involving 15,628 iron and steel workers. At the same time the department said there were 16 "other situations" affecting 24 workers in iron and steel disposed of during the month.

Washington

• • • Stockholders of the Tampa (Fla.) Shipbuilding & Engineering Co., according to information received by the Maritime Commission, have approved a reorganization plan which is expected to enable the company to bid for additional ship construction under the defense program.

The shipyard, to be known as the Tampa Shipbuilding Co., Inc., under the reorganization plan, has under construction eight C-2 cargo vessels.

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Style No. 7, available in 9 sizes and 3 grades, one for steel cutting, two for cast iron, brass, etc.



Style No. 1, available in 9 sizes and 3 grades, one for steel cutting, two for cast iron, brass, etc.



Style No. 13, available in 5 sizes and 3 grades, one for steel cutting, two for cast iron, brass, etc.



Style No. 14, available in 5 sizes and 3 grades, one for steel cutting, two for cast iron, brass, etc.

HERE is the solution to your problem of rapid tool deliveries. When you order standard tools from Carboloy you get immediate delivery from a constantly replenished stock. Shipments made same day your order is received. No waiting! No delays!

Anticipating the tremendous demand for Carboloy tools that has now actually taken place, Carboloy Company developed over a period of many months a line of broad-use standard tools, provided facilities for their mass production—and on September 3, 1940 announced them to the trade at extremely low, "mass-production" prices.

This rapid service is important to you under present conditions! To take full advantage of this immediate delivery service, many plants already have reviewed their entire tool requirements and changed over to the new Carboloy Standard Tools in every possible case.

Write today for catalog folder GT-125

CARBOLOY COMPANY, INC.

11153 E. 8 MILE RD., DETROIT, MICH.

Chicago • Cleveland • Newark • Pittsburgh
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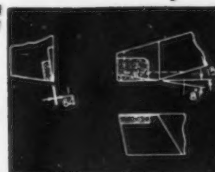


Carboloy standard tools comprise 5 styles in 3 grades (two for cast iron, one for steel) as shown. These styles, and their adaptations through rapid grinding methods available are suitable for broad use throughout your shop on 80% of all turning, facing and boring jobs.

- ✓ LOW PRICED!
- ✓ SIMPLIFIED ORDERING!
- ✓ SIMPLIFIED TOOL STOCKS!
- ✓ IMMEDIATE SHIPMENT!
- ✓ YOU GET THEM ALL GROUND READY FOR USE!

(Steel cutting tools furnished with ground-in chip breaker)

Example of
chip breaker
ground in steel
cutting tools.



CARBOLOY

REG. U. S. PAT. OFFICE

TANTALUM CARBIDES
TITANIUM CARBIDES
TUNGSTEN CARBIDES

Fatigue Cracks

BY A.H.DIX

He'll Never Frown Again

••• We read a story years ago about a man who had a gloomy face and who was a gloomy individual. But an automobile accident cut him up about the mouth, leaving him with a scar that gave him a perpetual grin, just the opposite of the bereaved young lady in "I'll Never Smile Again." For a time this was annoying, for inwardly he was morose, but he looked cheerful and was so treated by the people he met. After a while his disposition caught up with his face and he turned into a regular Pollyanna.

Whether or not there is anything in this, we wouldn't know, but it is well known that in time people will conform to a name. Which is why the British are smart in giving their combat ships fighting names like *Ferocious*, *Impregnable*, *Terrible*, and so on. For the same reason our own Navy errs seriously in naming one of its warships *The Flusser*. Those who are assigned to it are behind a psychological eight ball.

The same idea occurs to our technical editor, Tom Lipfert, who says:

"Speaking of fighting planes, there is something ominous about the name *Messerschmitt*, but certainly nothing ominous about the full name of the designer, *Willy Messerschmitt*."

Call for Mr. Benny

••• "Ominous" is what Professor Eduard C. Lindeman of the New York School of Social Work calls the absence of humor in the recent presidential campaign. Humor, he implies, is to democracy as grease is to axles, and its absence is an indication of a fascist trend.

In a controlled state, quips are frowned upon and lips are worn straight, or better still, bent earthward at the terminal points. The life-is-real-life-is-earnest-and-the-grin-is-not-its-goal attitude undoubtedly contributes to efficiency for a while, but in time there must be a lot of time out on account of stomach ulcers and assorted neuroses, perhaps resulting in a net loss.

In a fascist state there would be no point, of course, in reporting that a Los Angeles reader crosses his heart and says his wife went to school with a girl named Camille Etta Herring.

Crystal-Gazer Comes Cropper

••• That these are bad times for peerers into the future is demonstrated by a letter we happened to run across in the files. An American consulting engineer wrote it to us on July 20, 1939:

"One of our clients in England is at present engaged in the production of air components and wishes to consider the manufacture on royalty of any product which will fill his up-to-date machine and assembly shops when the aircraft demand is reduced, which he expects in the near future . . ."

Stoppers

••• Feed a Cow on Her Own Milk?—*The Trundle Engineering Co.*

The Machine that Casts the Shadow of a Man—*The Heald Machine Co.*

Sam Carbis Had an Idea—*THE IRON AGE*.

One of the best headlines of all time is, in our opinion, the one WEAf just used in its newspaper ads announcing the removal of its transmitter to Port Washington, L. I., "Last Night—While You Were Fast Asleep—Our Voice Changed."

We Fumbled It

••• While the missus was having her throat sprayed the other night we looked through a stack of Doc Robinson's trade papers—not the ones in the waiting room for the customers, but those he reads himself. One in particular caught our fancy. It was attractively laid out and not too hard to grasp. "I guess this is your favorite," we said. "No," he answered, "you've picked the worst one. *Looks good, but very lightweight.*"

When you are out of your own field you are running against football pool odds, which is probably the reason for the rash of reader preference surveys being conducted by advertisers in technical journals. We have heard of four in the last few weeks and are Galluping ahead in all of them.

Good Slogan

••• The Newark Steel Heat-Treating Co., Newark, N. J., advertises, "Where the Customer and the Steel are treated right."

Keystone State Word-Wrangler

••• B. L. Herman, your f.f.j.'s Pennsylvania advertising representative, just sent in a report containing a word with the biggest mess of vowels we ever saw under one roof—*fainaigueling*. For a moment we thought he was in the throes of his first bout with James Branch Cabell's shocker of yesteryear, *Jurgen*. But it proved to be just a tricky rendering of our old friend *phenagling* or *fenagling*. Nice going, B. L.

Our Yield Point Is Exceeded

••• The urge to expose to your gaze the orchids that are hurled at us is not over-powering, but we realize that our ecstasy in your yawn. And furthermore, we realize that boasting, even if vicarious, is commonest in those who realize unconsciously that they are slipping and who are trying to convince themselves that it isn't so.

Therefore, we treasure our tributes in secret, and expose this one merely to prove that New Englanders' reputation for conservativeness is greatly exaggerated. The writer is a large Connecticut manufacturer:

"If The Iron Age doesn't show up every Thursday morning we stand our mailing department on end until we find it."

And there is probably no harm in airing a modest violet like this from the chief engineer of an Ohio automobile body building firm:

"I have always considered your magazine one of the outstanding publications of its type."

But the flamboyant intolerance of this from a Cleveland manufacturer chills us:

"The Iron Age is in my opinion not one of the best on the market, but THE BEST."

"Dear Peggy and Nancy"

On the back covers of almost all the current magazines, with the exception of *IRON AGE*, the *New Republic*, and the *Southern Mortician*, appears a four-color advertisement in which the Beadleston sisters, of Park Avenue and Southampton, prattle away about how fond they are of milder, cooler, slow-burning Camel cigarettes . . . —*The New Yorker*.

We assure the Beadleston girls that we have nothing against them personally. It's just a matter of policy. Miss Basile, just so they won't feel hurt, send them letter 49-B, the one that begins snootily, "The advertising pages of *THE IRON AGE* are confined to products germane to . . ."

Puzzles

C. G. Stewart, La Grange, Ill., correctly figures out that Ann in the Nov. 7 problem is 16½ years and Mary is 27½, and offers to send in the method of solution. Thank you, but the brass hats keep us down to a page.

G.D.M., Watertown, Conn., writes that the Oct. 24 ladder problem has two correct solutions: (1) the ladder touches the wall at 19.354 ft. and the ground at 5.042 ft., and (2) vice versa. "Perhaps," he says, "someone can figure out the following. I can't."

A bull is tethered to a silo 20 ft. in diameter by a rope 20 ft. long. How many sq. ft. of grazing area has he?

THE *Northern* **SUPER-CRANE** is the one which gives you *All these Exclusive Features*

- ✓ Rigid one-piece welded steel trolley construction.
- ✓ Transmission type single unit, oil tight gear reductions.
- ✓ Easily removable gear case covers. Splash lubrication of gears.
- ✓ Heavy section girders designed for extreme lateral and vertical loads.
- ✓ Heavy duty roller bearings, turned and ground shafts, press fits on gears, wheels, etc.
- ✓ Standard heavy duty anti-friction bearing crane motors—oversize for severe service.
- ✓ Control equipment built by the outstanding specialists in industrial control.
- ✓ Special heavy duty crane wiring construction to insure safety and eliminate wiring troubles.
- ✓ Unit bridge drive mechanism combined with heavy welded steel end trucks.
- ✓ Hoist and bridge brakes designed for extreme loads and hard service.

Northern
Builders of CRANES
and HOISTS Exclusively for 40 Years

HEAVY DUTY CRANES . . . LOW HEAD-
 ROOM CRANES . . . BUCKET CRANES
 . . . TRANSFER CRANES . . . ELECTRIC
 HOIST CRANES . . . HAND CRANES . . .
 ELECTRIC HOISTS . . . AIR HOISTS
 . . . SPECIAL CRANES AND HOISTS

NORTHERN ENGINEERING WORKS

2607 ATWATER ST.

DETROIT, MICHIGAN

News of Industry...

\$20,000,000 Plant Expansion for T. C. I.

... Expansion of the steel making and finishing facilities at Birmingham, Ala., of the Tennessee Coal, Iron & Railroad Co., United States Steel subsidiary, is announced by Robert Gregg, president.

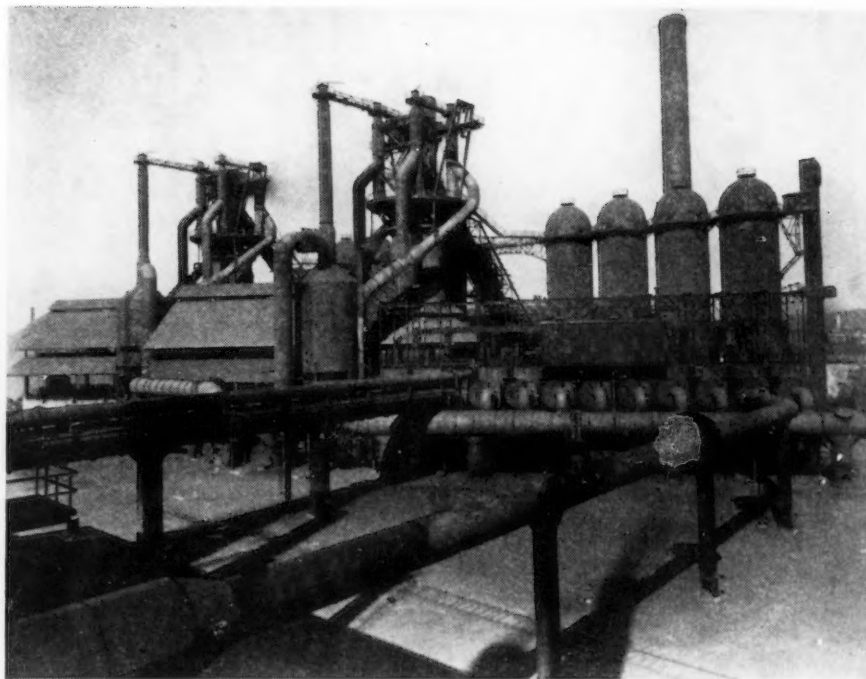
The new facilities, when installed, will result in approximately a 20 per cent increase in the ingot capacity—a little more than 400,000 tons—and a corresponding increase in the finishing capacity of the Tennessee company. Estimated cost of the project is \$20,000,000.

These improvements, which will commence immediately but which, by reason of their nature, will require about 18 months to complete, will place the Tennessee company in a materially improved position to carry out any obligation which may be required as a consequence of the national defense program.

Completion of a new blast furnace will end a shortage of pig iron for T.C.I. which is now being met by shipments of iron from Carnegie-Illinois furnaces at Gary, Ind. The new stack will permit a heavier melting schedule for the Fairfield open hearths. Such a project has been long considered for T.C.I.

The improvements comprise the following important features: Construction of an additional battery of coke ovens and an additional blast furnace at Fairfield Steel Works; improvements to the existing open hearth furnaces; development of ore and coal mining facilities to meet the requirements of the new blast furnace; additions and improvements to the plate mill at Fairfield, including a new 140-inch, four-high plate mill; additional wire drawings, galvanizing and finishing facilities at the Fairfield Wire Works; additional processing and finishing facilities at the Fairfield Sheet Mill.

These changes will necessitate enlarged operations at the ore



FAIRFIELD FURNACES—Illustrated here are Nos. 5 and 6 blast furnaces at the Tennessee Coal, Iron & Railroad Co.'s Fairfield plant. Another furnace is to be built here under the company's new expansion program.

mines, coal mines and quarries, including mechanical equipment, additional transportation facilities and, to the extent necessary, enlargement of and improvement in the steam and electric power plant and the water supply system.

"Our friends and customers in the South," Mr. Gregg said, "have shown such faith in us as to permit this substantial increase in our production facilities which will enable us to provide for their needs. The South is growing rapidly and we in the Tennessee Company are happy to join in that growth and to be a part of its increasing prosperity."

Mr. Gregg gave no estimate of the cost of the expansion undertaking. He said that the two most important consequences of the program will be, first, provision for the growing demand for steel products and, secondly, the substantial increase of the payrolls of the Tennessee company which will be reflected in improved economic conditions of the district.

Machine Tool Plants Expand in Middle West

... Some machine tool builders in this central area are forced to make absolutely necessary additions. W. F. & John Barnes Co., Rockford, has started construction of a plant addition and has launched a tool buying program. Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., is expanding plant facilities and will also build a government-owned plant, both expenditures involving in the neighborhood of \$1,750,000 including equipment.

Major purchasing programs are coming in from all sides directly due to defense production. Tools are now being purchased by Pettibone-Mulliken Corp., which is building gun carriages; Pullman-Standard Car Mfg. Co., which in addition to heavy railroad car production, is building tanks for Great Britain and gun carriages for the domestic defense program, and Bendix Corp., South Bend, Ind., building airplane parts.

Warner & Swasey Finds Shipments at Record High

Cleveland

••• With October shipments at the highest level in its history and current unfilled orders amounting to more than \$2,000,000, Warner & Swasey Co., Cleveland machine tool builder, is about to begin initial production in its third plant addition to be completed since the beginning of this year. Peak operations are expected to be attained next spring.

At the same time the company reported net profit for the nine months ended Sept. 30, after all charges and federal taxes at the new 24 per cent rate, of \$2,805,775, higher than for any full year in company history. This was equal to \$3.50 per common share, and compared with \$1,009,764, or \$1.26 per share, in the like period of 1939.

For the third quarter of 1940 net profit on the same basis was \$668,854, or 83½c. per common share, against \$433,070, or 54c. a share.

Census Bureau Issues 1939 Data On Steel

Washington

••• Moderate decreases in production, employment and wages for 1939 as compared with 1937 are reported for steel works and rolling mills by the Bureau of the Census. Value of products declined from \$3,146,263,440 in 1937 to \$2,720,019,564 in 1939; number of wage earners decreased from 437,962 to 368,904; while their wages declined from \$717,425,113 to \$569,724,280.

Unrolled steel, including ingots and castings, were reported to total 48,132,377 gross tons for 1939 and 51,682,080 tons for 1937. Steel ingot production aggregated 47,053,931 tons in 1939 and 50,432,916 tons the year before. Other totals reported by the bureau for 1939 and 1937 respectively were:

Semi-finished rolled products 39,221,831 and 43,490,875 tons; finished hot-rolled products and forgings 35,717,704 and 37,316,326 tons; scrap iron and steel 14,441,715 and 15,473,217 tons.

Newport News Backlog Nears Half Billion

••• Newport News Shipbuilding & Dry Dock Co. reports its unfilled orders as of Sept. 30 at \$465,376,000, compared with \$93,790,480 on June 25. This includes contracts with the Navy, U. S. Maritime Commission and private interests. To expedite the building of naval vessels, chiefly aircraft carriers, Newport News now has under construction two submerged ways. This type of way, the first in any private American yard, is at the same time a way and drydock, permitting construction of ships on level and eliminating risk and expense of launching.

Chrysler Leases Space In Graham-Paige Plant

Detroit

••• K. T. Keller, Chrysler Corp. president, announced Monday that the corporation had just signed a lease for 600,000 sq. ft. of floor space in the main plant of the Graham-Paige Motor Corp. on Warren Avenue, Dearborn. The expanding activities of the corporation, primarily because of its increasing cooperation in the national defense program, have made it important that it have added floor space immediately available.

Union Agreement Covers Living Cost Advance

Cleveland

••• A provision allowing reopening of wage negotiations in the event of rising living costs is contained in a one-year agreement renewed between the Oster Mfg. Co., here, and the CIO Steel Workers' Organizing Committee. William Donovan, SWOC director, said the agreement covered 90 workers.

Coming Events

Dec. 2 to 7—National Exposition of Power and Mechanical Engineering, New York.

Dec. 9 to 13—National Association of Manufacturers, annual meeting, New York.

School Loses Students, Teachers To Industry

Toledo

••• So great has been the demand for men in industry here that the national defense industrial training program at Macomber Vocational High school and some other schools has had difficulty in keeping classes together.

Of the men who enrolled early in the summer for special classes in mechanical lines to fit them for defense jobs, 698 have been hired. In the last month there were 545 men enrolled and 339 of them were carried over from the summer program. Teachers are also being hired by private industry.

E. L. Bowsher, superintendent of schools, said it may soon be necessary to let down requirements and take in men with little or no experience or curtail the teaching program.

Koppers Gets Two Coke Oven Contracts

Pittsburgh

••• Koppers Co. announced that it had received two orders for the design and construction of new coke ovens, totaling approximately \$2,000,000. Citizens Gas & Coke Utility, Indianapolis, has ordered 41 Koppers Becker type under-jet coke ovens to supply the increased demand for gas and coke in its territory. Work will start immediately. The ovens are to be completed within 11 months. Connecticut Coke Co., New Haven, Conn., is building nine additional Koppers Becker type ovens. Both plants are especially designed to produce high grade foundry coke.

Abart Gear to Buy Machinery to Expand

Chicago

••• Abart Gear & Machine Co. will soon purchase more machinery to step up production. A combination of a new intermediate line of work reduction units, plus general increased activity has bolstered the firm's sales to the point where production expansion is necessary.

Emergency Production Problems Studied at Management Meeting

Cleveland

••• Emergency production problems brought on by the vast government defense program were examined here Nov. 11 and 12 by more than 600 executives at the national meeting of the American Management Association's Production Division.

Difficulties in changing from single to multiple-shift; finding enough properly skilled men; training new workers; maintaining machinery; and keeping down scrap and repair losses were among the topics.

One keynote of the sessions was sounded by Alan C. Curtiss, Scovill Mfg. Co., Waterbury, Conn., who pointed out: "In these days of high taxes with higher to come, real economy demands that floor space be kept to a minimum; that equipment be utilized 24 hr. a day, if possible; and that it be replaced when worn out with new, modern equipment to cut cost of production."

In a symposium discussion Mr. Curtiss described the multiple-shift system at his company's plant at Waterbury. He said that in cases where organized labor has applied pressure to increase the bonus for the evening shift, to establish a higher bonus for the "graveyard" shift, or to abolish working on Saturdays, Sundays, and holidays; seven-day operation has been effectively checked where such demands have been accepted.

"Shifts in departments where 24-hr. operation is the rule normally run 8 hr. straight," said the speaker. He explained that in the power house, working 24 hr. per day and seven days per week, each man holds a given shift for a week before changing shifts. The casting shop uses rotating shifts, the men assigned to a given shift for four weeks. The supervisors rotate in the opposite direction for better man-evaluation and other advantages. Two-shift operation of the apprentice training courses has been augmented by a third shift recently.

"The boys in our training room are carefully selected high school

graduates," he said. "We find that much of the work on component parts of complicated tools can be handled by successive men. So in our training room a job is taken up by the second shift where the first shift leaves off."

The program for quick training of high-type machine tool specialists at the Warner & Swasey Co., Cleveland turret lathe producer, is essentially the same today as when started in May, 1935, reported R. J. Blyth, personnel director, in his paper, presented Wednesday.

"The age limit of our trainees is from 19 to 45," said Mr. Blyth. "We have men over the age of 40 in our shop today who are trainees and others who have only recently completed their training and become skilled mechanics. Requirements are: training in blueprint reading, mechanical drawing, shop mathematics, and machine shop practice. Those who have majored in machine shop work in high school have had some experience on such machines as lathes, milling machines, grinders, drill presses and turret lathes. They are, of course, by no means skilled, but with this experience they do have a good foundation on which to build actual shop training.

"In 1935 the company had more than enough equipment for all the learners that were put in training. There was a machine for every trainee to work on. With the recent rapid expansion of the plant, however, a new problem presented itself. We knew that the purchase of new equipment would require many new men. Delivery of this equipment was spread over a period of several months. The obvious question then was: why wait until the new equipment is received? Why not train the men on existing equipment and have them all ready to step into production the minute they are needed?

"A large group of learners was therefore started to work in the shop early this summer as observers. Their number has been increased since. Each observer is

assigned to an unusually able operator, who becomes his personal instructor. Of course, all learners who start as observers have to meet the same requirements as all other trainees. At first the learner does nothing but watch the operator. But after a few days he is allowed to help with the setup, then with increasingly difficult work until he can actually operate the machine himself. Although the learner thus receives most of his instruction from an operator, responsibility for his supervision is in the hands of the department foreman. Observers are started at 60 cents per hour—the same as the other learners. They are given 2½ to 3 months' training and are

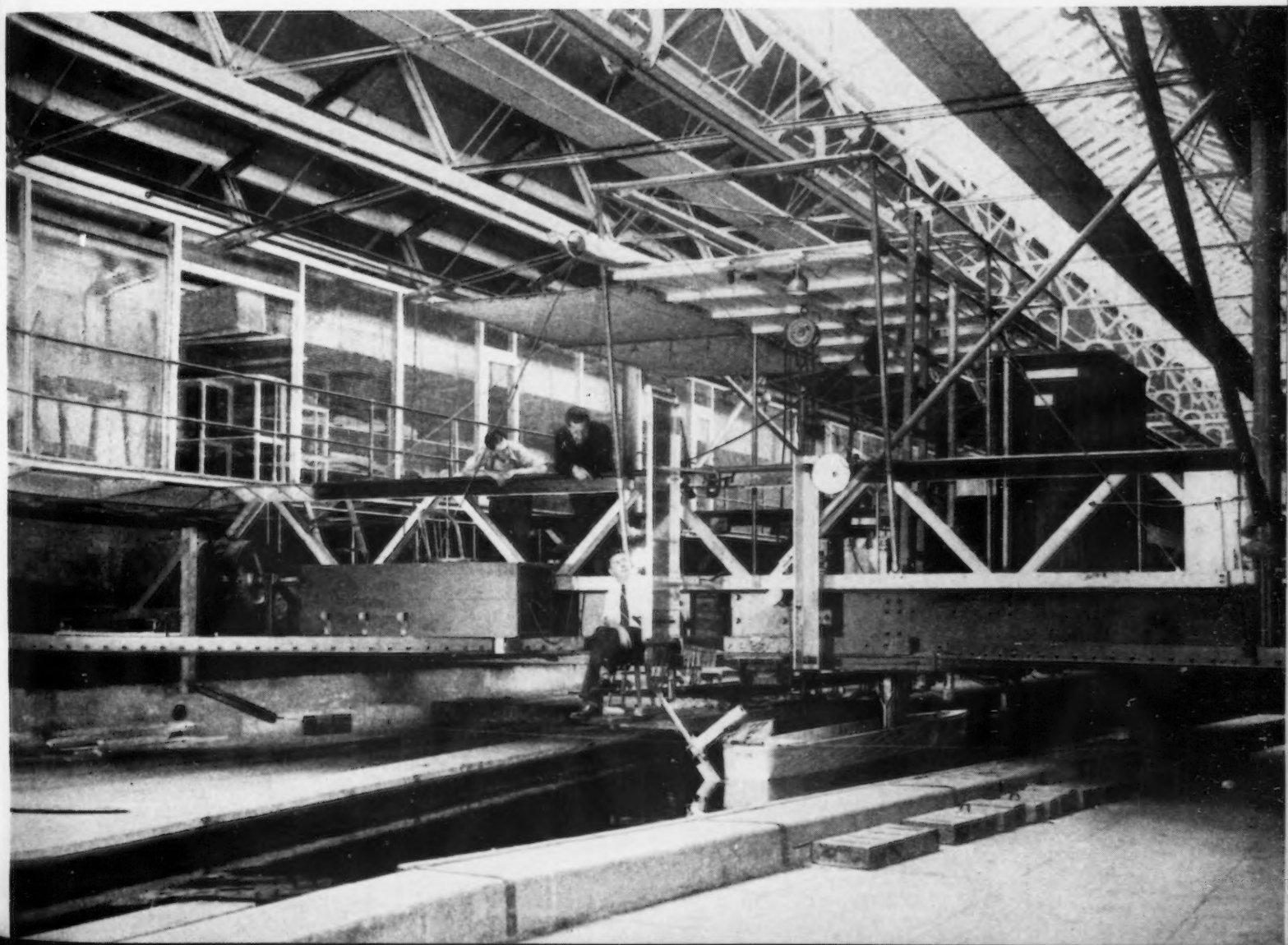
SHIPS' BIRTHPLACE—The major function of the Navy's experimental basin at Carderock, Md., is the building and testing of models of ships in accordance with modern methods. Under special conditions their behavior in water can be studied, hull lines and propeller design checked, and forces required to propel them can be measured. The water runway, opposite at top, is 963 ft. long, 51 ft. wide and 22 ft. deep. The lower photo shows a ship's model ready to start a test run.

Photo by Harris-Ewing

ready to go to work on their own when the new equipment is received. In most cases the learners stay on the old machines and the experienced operators are moved to the new equipment. Observers as well as learners are assigned to all three shifts.

"It has always been the policy of our company to up-grade employees wherever possible. Our apprentice training, for many years, has given us material to choose from for the better jobs, and by the same token, we look to our learner group for this type of material. We are using many young men, who started as learners, for such jobs as set-up men, inspectors and assistant foremen.

"Some 1300 trainees have been hired to date. Of this number



about 400 are currently in training. Of the rest, better than 75 per cent are still on the company pay roll as semi-skilled or skilled mechanics and on supervisory work.

"We ascribe the success of this program to two things: first, careful selection of the trainees and second, full cooperation of the set-up men and the skilled operators and assemblers in the shop. I cannot close this discussion without emphasizing the importance of these two points, especially the latter one."

Another of the principal speakers at the Tuesday symposium discussion was C. R. Hockmuth, assistant works manager, Kearney & Trecker Corp., Milwaukee.

Henry V. Oberg, Armstrong Cork Co., Lancaster, Pa., stressed the importance of the foreman as the central figure in maintaining multiple-shift operations.

"We have found," he said, "that the most satisfactory operation of a department results from the complete responsibility for its operation being vested in one foreman, regardless of the number of shifts.

"Shift foremen swing on the same shifts as their men," said Mr. Oberg. "I realize that there

may be advantages to having the shift foremen familiar with all the men in the department. However, it has been our experience that the best results are obtained by the shift foremen supervising the same men insofar as possible. The shift foreman working with his own men, builds up a team work which gives us better results."

When operating the plant five days or less, the scheduling of personnel is a relatively simple problem, said Mr. Oberg, but when operating a department six days a week, the company still endeavors to work men no more than 40 hr. a week, and, therefore, the rotation of shifts becomes the rotation of men and additional men must be found to fill out the sixth day. In the larger plants these men are drawn from a labor reserve.

"The labor reserve is composed of men regularly assigned to an operation who are used specifically for fill-in work," explained Mr. Oberg.

Under current conditions, said W. H. West, Thompson Products, Inc., Cleveland aircraft parts maker, scrap and repair becomes one of the uncontrollable factors, and in spite of every effort, becomes an alarming factor in the cost of the product.

"Analyzing facts based upon Thompson experience of the past year, new and inexperienced help was perhaps the major cause of scrap and repair during an expansion program. The following analysis was made and procedure set up:

"A learners' program was established to train men for a specific operation or machine. Specimens of scrap and repairs were collected and detailed explanation of the causes given, together with the sales value of the part. Experienced inspectors were placed on all shifts to trace daily scrap and repairs to their source and assist in determining the cause. Layoff periods to men persistent in causing repairs and making scrap proved helpful, as well as shifting men to work which they were better qualified to perform.

"Second, with the tool room overloaded, inadequate and poorly designed tools, together with poorly maintained equipment, contributed in a great measure to the cause of scrap and repair. The practice of using makeshift tools was discontinued. Overtime on all productive equipment was eliminated wherever possible to give men and machines a rest.

"Third, a card system which had formerly proved helpful, was inaugurated and this double-check reduced scrap.

"With a definite procedure of control established, scrap, repairs and customers' rejections were carefully studied by our engineers to determine the possibility of improvement in method of manufacture and causes of rejections. Operations causing the largest number of rejections were carefully studied and improvements resulted. In some instances, customers were requested to revise specifications, with excellent results to both parties. Routings were corrected to improve the product, and production lots increased."

Third shift operation, a necessary evil, is a contributing factor to the cause of scrap and repair, said Mr. West.

George H. Prudden, works manager, Vega Airplane Co., told how his concern, faced with the necessity of rapidly expanding its working force, turned to scientific

FLYING AMBULANCE—Patients are shown inside the Army's newly-developed cargo-transport plane after its conversion, within 20 min., into a flying ambulance. The aircraft has facilities for 12 patients and carries a pilot, co-pilot, doctor and nurse.

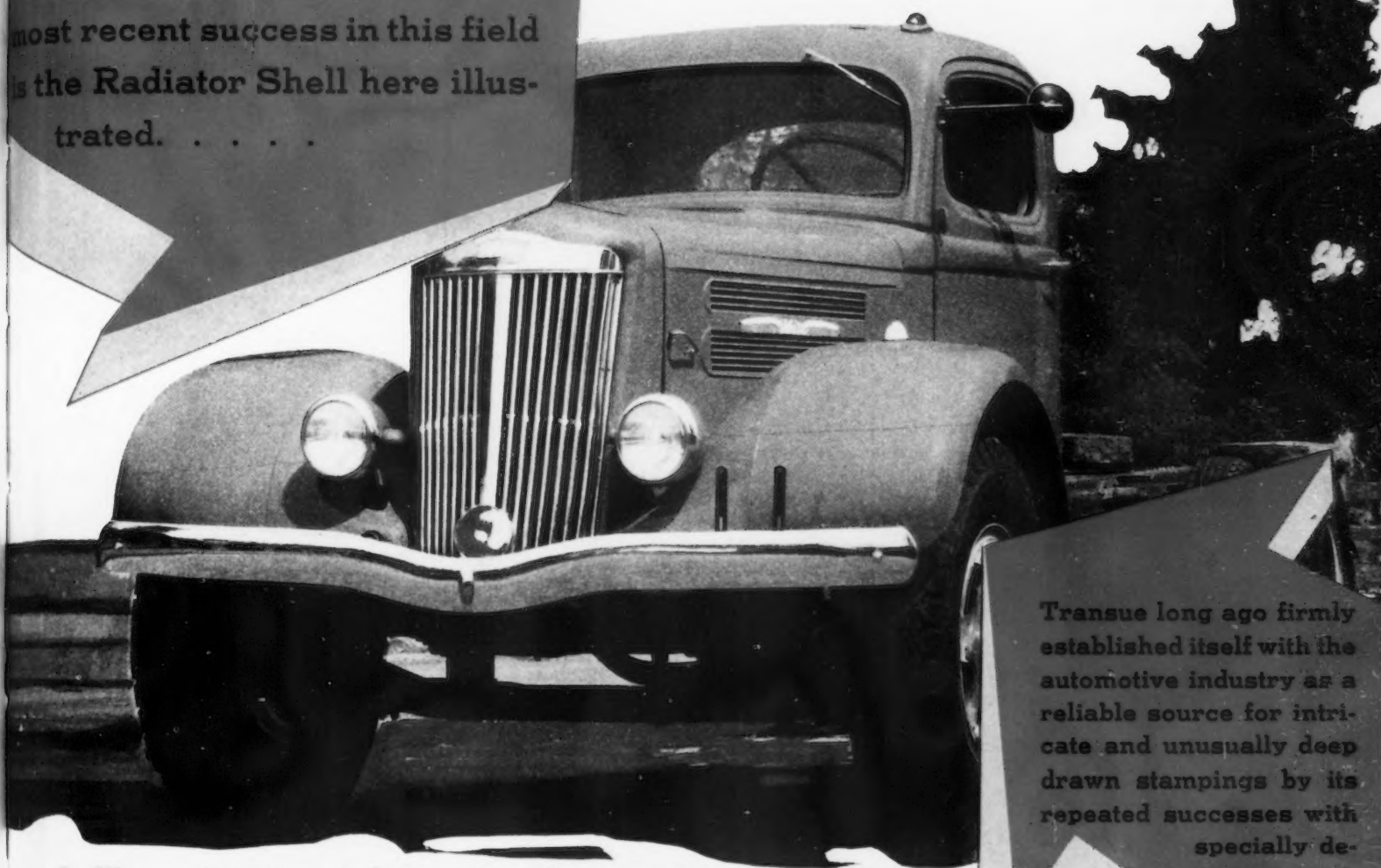
Photo by International



Transue has, in the past two years, been chosen to design and produce pressed steel radiator shells for an ever growing list of trucks and tractors. Our most recent success in this field is the Radiator Shell here illustrated.

PRESSED STEEL STAMPINGS

FOR THE TRUCKS OF AMERICA



● The automotive industry is only one of many industries now looking to Transue for design help in producing parts or products in pressed steel. The reason is twofold: our ability to design unusual stampings to fit unusual requirements—and our facilities, after that, to produce them economically.

The Transue engineering department welcomes new problems in pressed steel . . . so write, wire or phone any of our district offices for a man to talk it over—no obligation.

FOR THOSE MANUFACTURERS HAVING THEIR OWN PRESS EQUIPMENT, TRANSUE WILL GLADLY QUOTE ON DIE REQUIREMENTS.

Transue long ago firmly established itself with the automotive industry as a reliable source for intricate and unusually deep drawn stampings by its repeated successes with specially designed truck oil pans.


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DESIGNERS AND MAKERS OF
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DETROIT · INDIANAPOLIS · CLEVELAND





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BECAUSE Parker-Kalon Cold-forged Socket Screws, Wing Nuts, Cap Nuts and Thumb Screws are made to such exacting standards, both small users and large enjoy the benefits that come with accuracy, strength, good design and fine finish. No wonder, then, that so many thousands have standardized on Parker-Kalon. Samples and prices are yours for the asking. Write.

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PARKER-KALON
Cold-forged
**SOCKET SCREWS WING NUTS
CAP NUTS THUMB SCREWS**
SOLD ONLY THROUGH REPUTABLE DISTRIBUTORS

selection methods in finding workers.

"We have our 5000 men in training right now," he said. "We do not try to assemble a group of 'super-men,' geniuses or 'world-beaters,' but we do attempt to eliminate the mentally unbalanced and habitual malcontents. For this reason, we emphasize the use of a temperament or personality test. It is generally recognized that there are those unfortunate individuals of such temperament and character that they cannot fit well into the industrial world.

"The four major points for which we look in an applicant are: (a) a well balanced temperament; (b) aptitude for a particular job; (c) special knowledge or skill; (d) intelligence.

"Temperament is given as a primary requisite because we have found, as many other industrial concerns have done, that more than 75 per cent of the individual failures in industry are due to temperament faults—often termed 'personality traits'."

The speaker described tests used for intelligence, mechanical aptness and dexterity, trade knowledge and temperament. The latter is the Humm-Wadsworth test consisting of a set of 318 "yes-or-no" questions.

Testing designed to fit men to specific types of jobs should appeal to unions as well as to management, Dr. Charles A. Drake, director of the bureau of instructional research at West Virginia University, told the conference. Dr. Drake, who is consulting industrial psychologist for Johnson & Johnson, New Brunswick, N. J., said he believed dexterity tests were far superior to verbal and "pencil-and-paper" tests for many types of assembly and inspection workers.

Discussing new developments in the selection of factory workers, the psychologist described the operation of various tests used to select the best employees for particular types of factory work.

A new method of scoring such tests, he said, permits the forecasting of the level of efficiency of the worker on the job after he has been selected and trained.

Wendell M. Nelson, assistant to the manager of the Schenectady

4 Stone Carvers Turn Billet Chippers for S-T

Chicago

••• The theory that some industrialists have lately been advancing — "that transfer of workers to related occupations is a partial solution to the problem of labor shortage" — is upheld by the recent experience of Youngstown Sheet & Tube Co. at its Indiana Harbor plant. Youngstown needed five experienced billet chippers but found that all skilled chippers in the district were already employed. But, four stone carvers applied for jobs at the same time. It was found that the work involved was dissimilar only in the materials worked on so the stone carvers were given a chance. P.S. The stone carvers did a good job on their tests and are doing a good one today in the steel plant.

works of General Electric Co., described a method of training foremen which has been developed over the years at Schenectady.

"Based on experience with the lecture method and of inter-departmental visits, it was decided to conduct a series of foremen's conferences for every supervisor in the plant," said Mr. Nelson.

"In developing the program for the conference method, certain principles were adopted in recognition of the following facts: as foremen deal with specific situations, discussion must be led from specific matters to general policies and principles; company policy is developed from the experience of daily operations and represents the combined best judgment of all who participate in management; all subjects should be discussed from the operating point of view; all grades of supervision from the foreman to the manager must be familiar with the program."

Foremen have been divided into 29 groups, said Mr. Nelson. Each group met once a week on company time for a two-hour session. Minutes of the meetings were kept. Two problems are securing effective leadership for groups, and avoiding the tendency toward degeneration into mere "panning" groups. The company has anticipated and successfully met both problems.

Each one labelled to show strength and hardness...

CERTIFIED GEARS



...cast in **NICKEL** alloyed iron

DEPENDABILITY is all-important to the designing or specifying engineer when selecting a gear and no gear is more dependable than the material from which it is made.

Braun Certified Gears are dependable. Made of a Nickel-chromium-molybdenum cast iron each gear is tested, labelled and guaranteed to provide a minimum tensile strength of 50,000 p.s.i. High hardness controlled within narrow limits reduces

abrasive wear, preserves tooth contours and assures longer service.

The improved properties of Nickel alloy cast irons enable Braun gears to more successfully withstand abnormal loadings and stresses. Furthermore the uniformly high strength of this material permits redesigning for smaller gears and more compact assemblies.

Consultation is invited on your problems involving Nickel.

Typical minimum properties of Nickel-chromium-molybdenum cast iron used by Braun Gear Corp.:

Minimum tensile strength, p.s.i.	50,000
Compression strength, p.s.i.	150,000
Shear strength, p.s.i.	58,000
Torsional strength, p.s.i.	67,000
Modulus of elasticity	20,000,000
Torsional modulus elasticity	7,500,000
Transverse strength, lbs.	3,000
Transverse deflection, in. ....	.004
(test bar 1.2" diameter, 18" span)	
Brinell hardness	220
Weight per cubic inch, lbs.	0.26

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK, N. Y.

J-L Stack to be Air Conditioned

Pittsburgh

••• Marking the first installation of the kind in the North, an air-conditioning unit is being installed at Jones & Laughlin Steel Corp.'s No. 1 blast furnace, Aliquippa, Pa., and work is expected to be completed by Jan. 15.

Carrier Corp., the same company which furnished two such units to the Woodward Iron Co., Birmingham, Ala., is supplying the air conditioning equipment while the installation is in the hands of the Dravo Corp., Pittsburgh.

Briefly, by the use of an air compressor, water is chilled and shot out in a fine spray through which the air for the blast furnace passes. The air is thus cooled and is dehumidified.

Jones & Laughlin expect by this installation to test the effect of uniform air conditions on pig iron production, aiming at a consistent content of three grains of water per cu. ft. of air.

Since there is a relationship between moisture content in the air and silicon content in the iron, it is expected that control over the latter will be more precise.

It is understood further that the outcome of this air conditioning on pig iron yield will definitely

determine the feasibility of a similar treatment to the air going into bessemer converters as well as the installation of additional units for other blast furnaces.

American Rolling mill has a chemically operated Blaw-Knox air conditioning unit at one of its blast furnaces at Ashland, Ky.

Blast furnace operators are extremely interested in these installations as they recall the pioneering work of James Gayley in 1905 which resulted in an attempt being made at Carnegie Steel Co. and other pig iron producers plants. The cost of conditioning the air was more or less prohibitive and for that reason was dropped at that time.

EXPORT-IMPORT TOTALS OF UNITED STATES FOR SEPTEMBER

IMPORTS

September		Nine Months Ended September	
1940	1939	1940	1939
1,830	4,176	9,554	29,423
25	12,051	17,743	53,748
137	160	1,009	1,238
...	12	215	212
...	53	610	1,275
56	3,216	1,484	25,183
2,048	19,668	30,615	111,079
...	14	440	279
...
37	1,052	3,986	7,565
37	1,066	4,426	7,844
2	80	115	1,378
...
...	2	10	23
...
11	1,261	1,806	17,614
...	143	194	578
...
1	107	855	1,078
2	2,080	614	22,858
...
...	1,936	710	37,448
...	...	16	5
11	9	89	51
...
...	117	31	4,402
336	220	2,685	25,038
...
34	185	883	1,796
4	74	490	1,383
...	1,159	86	14,650
47	311	2,056	3,729
1	549	107	6,882
1	7	129	86
1	85	1,445	4,805
...	...	12	80
...	17	3	324
451	8,342	12,336	144,670
...	782	419	1,478
27	3	29	115
35	13	468	961
...
...
62	798	916	2,554
2,598	29,874	48,293	266,147

EXPORTS

September		Nine Months Ended September	
1940	1939	1940	1939
84,677	28,192	408,351	71,360
611	329	11,800	541
...
5,441	462	17,015	1,778
...
255,608	330,680	2,419,833	2,761,594
346,337	359,663	2,856,999	2,835,273
353,448	13,283	1,590,071	77,079
38,576	8,035	67,946	14,762
19,817	13,172	84,693	30,432
50,891	1,829	217,382	17,615
462,732	36,319	1,960,092	139,888
36,543	20,946	376,884	203,926
13,534	8,918	129,919	75,464
302	242	4,113	2,593
123	72	1,338	665
65,166	22,431	408,440	190,244
109	686	1,828	1,866
67	9	398	93
70,917	20,472	484,997	118,052
1,062	74	11,478	488
3,585	434	22,135	9,142
347	8	935	235
...
17,271	6,766	145,838	54,343
172	44	1,308	401
39	42	610	722
1,260	1,531	10,228	6,244
69,470	19,409	275,022	79,927
6,115	2,568	55,289	24,257
15,683	27,701	334,417	178,957
2,147	1,121	21,946	18,788
9,318	4,872	82,703	33,557
20,962	8,073	145,926	55,222
3,173	766	18,795	5,868
10,017	2,640	69,364	20,286
1,144	518	9,501	3,520
3,584	5,594	33,673	36,525
12,963	4,391	100,694	38,617
474	455	5,466	4,026
5,434	757	20,575	5,952
30,654	5,483	198,641	57,281
...
1,362	651	15,851	5,815
402,997	167,674	2,988,312	1,234,176
3,912	6,026	56,966	29,006
391	394	3,844	2,858
3,357	981	27,043	12,642
296	99	4,053	2,546
1,030	4,457	12,475	22,193
8,986	11,957	104,381	69,245
1,221,052	575,613	7,909,784	4,278,582

¹ In imports the tonnage shown is the alloy content; the manganese, chromium and silicon content, as the case may be. ² Imports include skelp and saw plate. ³ Import figure included iron slabs. ⁴ Imports include sashes and frames only.

* No separate figures.

MAHON ROLLING STEEL DOORS



... a NEW STANDARD of Quality and Dependability

Mahon Rolling Steel Doors are now in service in every type of building throughout the width and breadth of the country . . . they are built to last a lifetime, and, being modern in every detail, they have many new features not obtainable in any other make of door. The Mahon Power Operator, for instance, offers distinct advantages in design and operation—all gears in the mechanism are enclosed in an oil-tight gear-box and run in a bath of oil . . . the auxiliary or emergency chain-gear operator does not drive through the motor shaft, as is common practice in other power operators. All other operating and automatic mechanism that go into Mahon Standard and Underwriters Labelled Doors are equally as modern. Write for complete catalog, or see Sweets.

THE R. C. MAHON COMPANY

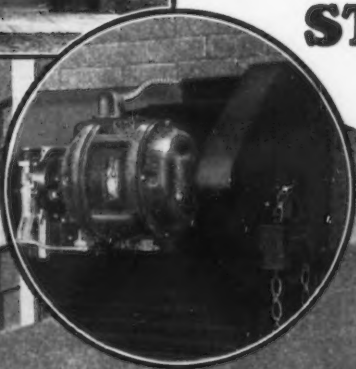
DETROIT, MICHIGAN

Representatives in Principal Cities.

MAHON
STEEL ROLLING DOORS

APPROVED BY THE UNDERWRITERS' LABORATORIES INC

Illustrations show Mahon Rolling Steel Doors installed in the Chevrolet Foundry Bldg., Saginaw, Mich., Pacific Gas & Electric Company's plant, Herndon, California, and the U. S. Appraisers Stores, Chicago, Ill. Inset is the unique and very compact Mahon Standard Power Operator.



Bearings Are Given Prize Fight Ratings

Indianapolis

• • • Link-Belt Co. has gone whimsical with as non-whimsical a subject as anti-friction bearings. Tired, they say, of trying to cope with the difficulty of distinguishing between the series numbers assigned various units, they now call their line "Friction Fighter" bearings. Instead of number so-and-so, the five types are now known as Flyweight, Welterweight, Middleweight, Heavyweight and Alternate Heavyweight.

\$11,254,700 Plane Plant Contract Is Awarded

Washington

• • • Western Land Improvement Co., subsidiary of the Douglas Aircraft Co., Santa Monica, Cal., has been given an \$11,254,700 contract by the War Department for plant expansion at Long Beach, Cal. Un-

der the terms of the emergency plant facility contract, the company supplies the construction funds, the government repays over a five year period, and the contractor then has the option of purchasing the property or transferring title to the Government.

G-M Acquires Antioch College Casting Process

Cleveland

• • • Officials of Antioch College at Yellow Springs, Ohio, are reported to have announced the sale to General Motors Corp. of the assets and license rights of a process of casting non-ferrous metals—bronze, aluminum, magnesium, etc.—developed in the college foundry.

General Motors and the college will erect a new research building and the firm will establish a production foundry at its Delco-Remy plant at Anderson, Ind., for the manufacture of castings for the aircraft, Diesel engine, rubber and other industries.

Priority Orders to Come Directly From Board

Washington

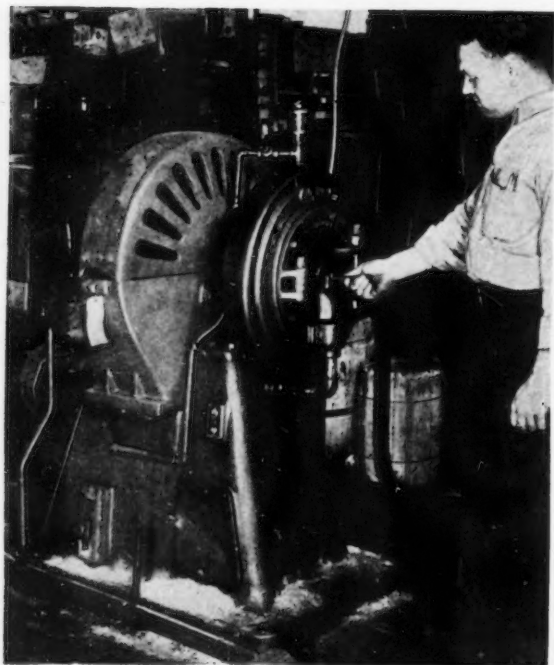
• • • Reports coming to Washington make it clear that the impression prevails that legal procedure will be required to get a priority order from the National Defense Advisory Commission. This is not correct. While no priority orders have as yet been issued, when they become necessary, as it is expected they will for some products, they can be obtained directly from the Priorities Board by a company, regardless of whether it is a large or small concern, assuming it has justification for getting such an order.

Though the commission has set up a Machine Tool Priority Committee, it continues to operate in all industries under the voluntary preference rating system and will continue to do so as long as that is practicable. This of course does not mean that priority orders will not be found necessary soon in such pressed national defense lines as the machine tool industry.

The general view is that the voluntary preference rating system is working so satisfactorily in steel that priorities for the industry are not an early prospect.

MAKING SAFETY A CERTAINTY

At a Profit



The Above Photograph Shows a Production Operation That Calls for Dependable Performance—Swaging Fittings On To Flexible Cables for Automobile Brake Assemblies and Airplane Controls—And It Is Profitably and Rapidly Handled With This ETNA SWAGING MACHINE!

WITH ETNA SWAGING MACHINES

• Since putting ETNA Swaging Machines to work on this specific job (which is one that requires outstanding finished product dependability), this manufacturer is making safety a certainty on every job that leaves his shop—and at a profit too. The machine shown here, like every ETNA unit, is a consistent performer—the product of more than a quarter century of qualified experience. The ETNA drum is of alloy steel securely mounted on the base; Timken Bearings carry the main load on the spindle and thrust; the spindle is an alloy steel forging, heat treated and ground; the hammers, rolls and inner ring are of carefully selected alloys, and the motor is mounted on an adjustable bracket. ETNA Swaging Machines are built in capacities of 3/4" to 4" diameter with die lengths 1" to 18". Larger sizes built to order.

WRITE NOW
FOR LATEST
BULLETINS

THE ETNA MACHINE COMPANY
3400 Maplewood Ave. Toledo, Ohio

1053 Auto, Parts, Body Plants Listed In Census

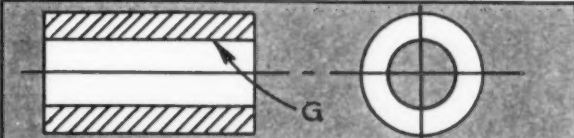
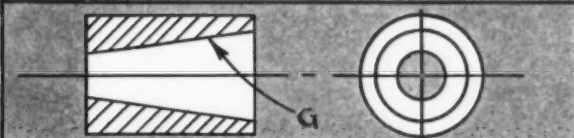



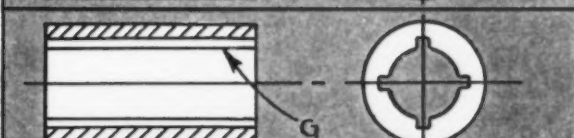

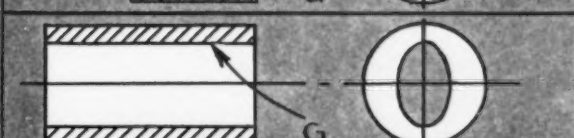

Washington

• • • Preliminary figures compiled by the Bureau of the Census show that 1053 establishments manufacturing motor vehicles, motor-vehicle bodies, parts and accessories turned out products in 1939 valued at \$4,039,930,733, employed 397,537 wage earners and paid \$645,142,599 in wages. This compared with 986 establishments which in 1937 manufactured products worth \$5,279,696,851, employed 508,341 workers, and paid out \$803,415,641 in wages.

There were 2,822,261 passenger cars valued at \$1,798,252,016 turned out in 1939, according to Census Bureau compilations. In 1937 there were 4,732,553 units manufactured, carrying a value of \$2,848,786,150.

Commercial type vehicles in 1939 numbered 441,750 valued at \$282,757,929. In 1937 there were 612,743 units valued at \$377,369,380.

GREATER PROFITS FROM GREATER *Versatility* WITH BRYANT INTERNAL GRINDERS

	<i>Straight Holes</i>
	<i>Taper Holes</i>
	<i>Blind Holes</i>
	<i>Open Holes</i>
	<i>Plain Holes</i>
	<i>Splined Holes</i>
	<i>Curved Holes</i>
	<i>Irregular Contours</i>
	<i>Face Grinding</i>

The versatility of the Bryant line of internal grinders pays real dividends in the job shop or in the production line. Not only will these machines grind the variety of work shown above, but they

will grind any of these forms in combination. If you are interested in additional profits on your internal and face grinding jobs, send blueprints or samples to Bryant for complete information.

BRYANT CHUCKING GRINDER CO., Springfield, Vt.

Sloan Urges 6-Day Week for Defense

America today is working a shorter number of hours per week than any other nation—certainly any other involved in war or de-

fense, Alfred P. Sloan, chairman of General Motors Corp., said last week. Output can be increased 20 per cent by working six days a week in place of five days he told the Academy of Political Science at New York. "It seems clear this should be the first step, if the

point is reached when the slack of unemployment has been taken up and the increasing speed of industry has been utilized to the fullest practical extent. The penalty for overtime should be cancelled during the emergency to encourage a longer work week," Mr. Sloan said. He continued:

"It appears clear that we can and should, in our own self-interest, impose the new set of demands upon the existing ones. We should expand existing production in harmony with the increased purchasing power available, to the point of full productivity. We should increase the hours of work per week should the necessity arise. Under such a program, the standard of living could be maintained. It would, in all probability, be somewhat advanced during the period of emergency.

"The burden of unemployment, such a drain on the economy, would be relieved to offset, in part, the cost of the defense program itself. Taxes and other revenues of the government would be increased. In other words, we should meet this emergency by expanding the production of goods for both peace and defense rather than by unduly diverting the production of usable goods to the implements of defense."

Welding Instruction Books Published by Airco

• • • Instructional material for use in training men in oxyacetylene welding and cutting processes has just been prepared by the Air Reduction Sales Co., 60 East 42nd Street, New York. The course consists of two separate books, one containing a set of 22 work sheets each describing and illustrating several basic exercises in welding. The other book consists of a number of lectures describing the history of the art, the properties of various materials and the theory and practical application of gas welding in industry. The course in shop exercises sells for 50c. per copy and the lecture books sell for \$1.

Air Reduction has also prepared similar instructional material on arc welding practice. There are 30 exercises in the arc welding instruction course. Both arc welding course and related lecture material sell for \$1.

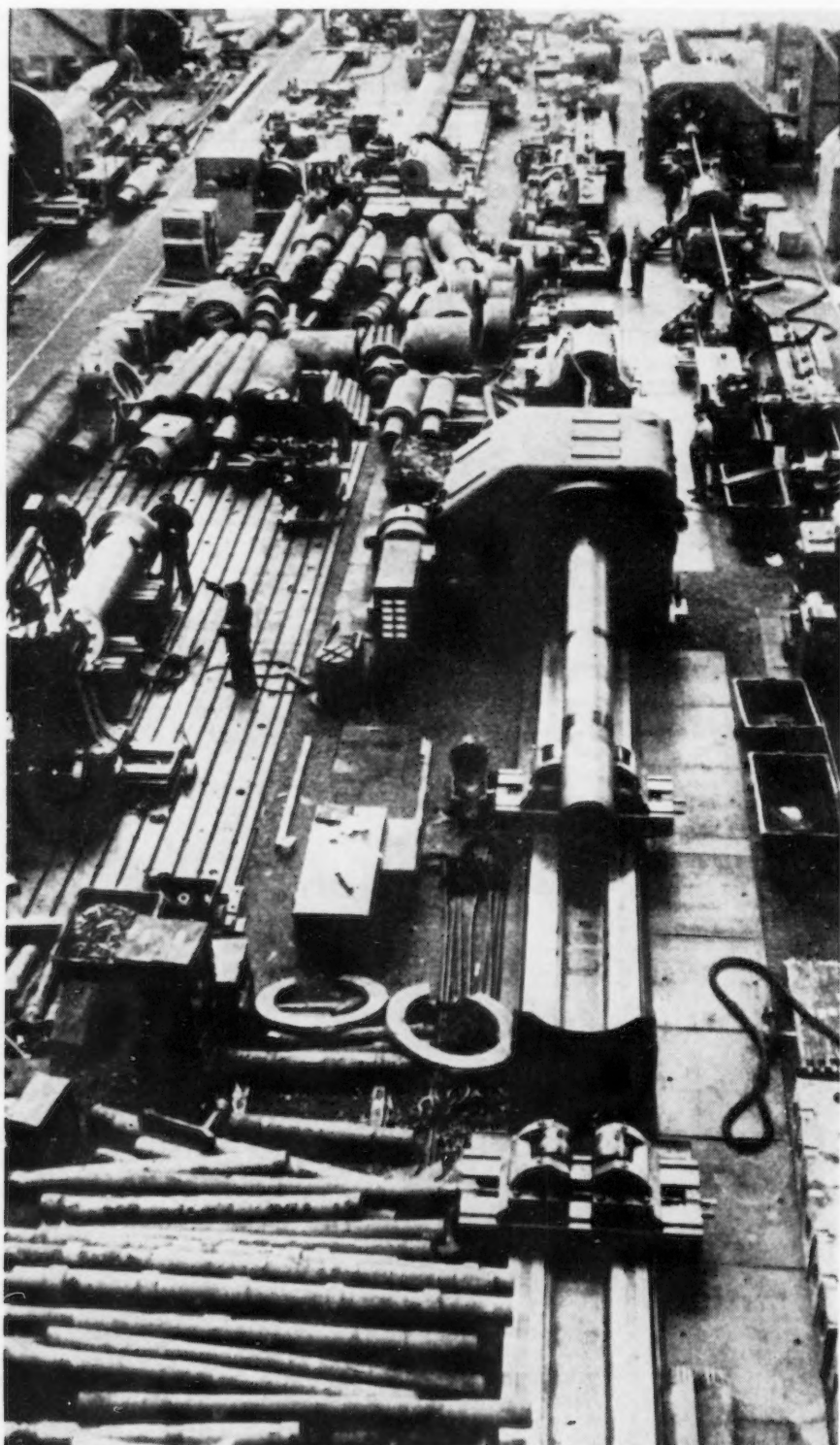


Photo by Wide World

GERMAN GUN PLANT—This photo, passed by the German censor, shows the interior of a German armament plant where big guns are manufactured for the Army and Navy.



MESTA

HEAT-TREATED
SPECIAL ALLOY STEEL
BACKING UP ROLLS

MESTA MACHINE COMPANY • PITTSBURGH, PA.

Hillman, NLRB Hamper Defense Purchasing, Toland Tells NFA

••• Sidney Hillman, member of the National Defense Advisory Commission, and vice-president of the CIO, is exerting "all possible influence to prevent contracts being negotiated with employers who

are alleged by the National Labor Relations Board to be violating the NLRA," Edmund M. Toland, formerly general counsel to the Congressional Committee investigating the NLRB, declared in an

address at the 44th annual convention of the National Founders Association, held last week at the Waldorf-Astoria Hotel, New York.

The significance of this effort, Mr. Toland said, is in the fact that the mere charge of non-compliance by the NLRB, which he said was guilty of the "most flagrant examples of dereliction," would be

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Makes Pickling Efficient

- Stops Waste of Acid and Metal.
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- Cuts Costs.
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Bulletin on request



AMERICAN CHEMICAL PAINT CO.
DEPT. 309, AMBLER, PENNA.
Detroit, Mich., 6339 Palmer Ave., E. Canadian Branch, Walkerville, Ont.



W. D. HAMERSTADT, Rockwood Mfg. Co., Indianapolis, Ind., re-elected president of National Founders Association.

sufficient to prevent a plant from obtaining defense contracts, regardless of the actual guilt of the employer involved.

To accomplish this, Mr. Hillman requested an opinion from Attorney General Jackson, Mr. Toland said, and received it despite the fact that the attorney general is said to have stated that he was not authorized to give opinions except to the President or heads of executive departments. Mr. Hillman, the speaker pointed out, was neither the President nor the head of an executive department, but he nevertheless obtained the opinion.

These efforts on the part of Mr. Hillman's were a threat to the defense program and only the prompt action of William Knudsen, former General Motors Corp. executive and a member of the Defense Council, in pointing out that the mere charge of violation of the

act was not sufficient to justify refusal of defense contracts prevented serious confusion in the defense program, Mr. Toland said.

Mr. Knudsen's remarks were to the effect that the commission's policy was to refuse contracts to employers who actually were adjudged guilty of violating the NLRA until such a time as the violations ceased, but that the

"National unity for national defense," he said, "means unselfish cooperation of all classes, industry and labor, without encroachment by any one group upon the rights of others and without sacrifice of rights on the part of any."

Mr. Toland described the War Labor Board of the World War as consisting of five representative employers, five unionists and two

citizens, who met the labor-relations problem "honestly, efficiently and simply."

The convention, which was exceptionally well attended this year, gave serious consideration to many of the problems facing management in the foundry industry. Apprenticeship, national defense, wage plans, the influence of new legislation on plant operating



D. C. BAKEWELL, Blaw-Knox Co., Pittsburgh, reelected vice-president of National Founders Association.

commission did not intend to penalize the program by refusing orders simply because a firm was accused of violating the act.

Formation of an organization, similar to the old War Labor Board, was recommended by Mr. Toland as a means of eliminating partisan influence from the defense program. "Such a board," he said, "of competent and unbiased personnel would restore the faith of the people in the government's ability to administer the field of labor relations, a faith which looks askance at the sight of the member of the Advisory Commission drawing an annual salary as president of a union affiliated with the CIO and serving as vice-president of the latter organization while his industrial colleagues have divorced themselves from all industrial positions."

A GALVANIZED METAL You Can DRAW and PAINT!



523 DRAWS... AND NOT A DUD!

• That's how ARMCO galvanized ZINCGRIP-PAINTGRIP sheets went through their profit-paces for the manufacturer of these fuel reservoirs.

This double-purpose metal meant extra advantages for the fabricator. The 3½-inch draw had no effect on the tightly adherent ZINCGRIP coating. There was no flaking, no peeling of the zinc. No die-scoring either.

Next the bonderized surface of ARMCO PAINTGRIP came into play. This special mill finish permitted quick

painting in any color! No etching, no loss of the protective zinc coating.

Time and money were saved on make-ready too. Only a soapy water solution was needed to prepare the sheets for the dies. Since oil was not used surface cleaning before painting was easier and less costly.

Maybe you can profit from this double-edged sales mover and shop saver. The experiences of many other manufacturers with ARMCO ZINCGRIP-PAINTGRIP bear this out. Would you like to see the evidence? We'll be glad to show you. Write The American Rolling Mill Company, 1870 Curtis Street, Middletown, Ohio.

ARMCO



ZINCGRIP-PAINTGRIP SHEETS

procedure and new developments in the foundry industry were among the subjects discussed at the two-day meeting.

William D. Hamerstadt, Rockwood Mfg. Co., was reelected president of the association and D. C. Bakewell was chosen vice-president. Secretary-treasurer J. M. Taylor was reelected.

New members of the various district committees chosen at the

meeting are: A. M. Cottrell, C. B. Cottrell & Sons Co., Westerly, R. I.; J. H. Hornung, Otis Elevator Co., Yonkers, N. Y.; E. C. Moore, Erie City Iron Works, Erie, Pa.; John M. Price, Ferro Machine & Foundry Co., Cleveland; Ira G. Whitney, A. Y. McDonald Mfg. Co., Dubuque, Iowa; F. H. Clausen, Van Brunt Iron Works, Beloit, Wis.; H. O. Menk, Harnischfeger Corp., Milwaukee; and Warren

Defense Output Peak Seen In Spring of '42

• • • The peak of the defense production will probably take place in the spring of 1942. The number of apprentices now in training is less than 100,000. This number should be increased to at least 500,000 if we are to meet our estimated needs in the next few years."—W. F. Patterson, chief of apprenticeship, U. S. Department of Labor, in an address before the annual convention of the National Founders Association.

SUCCESS STORY

THEY LICKED THE PROBLEM OF WEAR

... Longer Service Brought Lower Costs

The spacers in a tin sheet feeder are subject to extreme wear. One mill reports that no steel spacers had ever lasted more than 3½ months. But when spacers made of AMPCO METAL, Grade 22, were installed, they showed no wear in over a year of service!

Which Is Only One Example

of the phenomenal savings and stepped-up performance that often follow a switch to AMPCO METAL . . . There's nothing else like this remarkable bronze in its resistance to wear and "squashing" under impact—its resistance to fatigue, stress and corrosion — the extreme hardnesses available.

AMPCO METAL, INC., Dept. IR 1121, Milwaukee, Wis.

IF YOU HAVE A PROBLEM caused by "metal failure" in some part of your product or production tools—why not give AMPCO METAL a trial? It is noted for making good where other metals fail. Explain your problem to our metallurgists. We will offer recommendations and complete data.

AMPCO METAL

The Metal Without An Equal

Whitney, James B. Clow & Sons, Birmingham.

The association also approved of two resolutions. One was to the effect that the association would cooperate with the government in every manner for a reasonable program of national defense and that the association desires, so far as possible, that the United States keep out of war.

The second resolution deplored the administration of the NLRB and urged the Defense Council to use every means in its power to urge a change in the membership of the NLRB, so as to insure an impartial administration of the labor act and to restore confidence of both labor and industry. (Dr. Harry A. Millis was appointed chairman of the NLRB on Friday, to succeed J. Warren Madden. Editor's note.)

W. D. Hamerstadt, in making his annual report as president, revealed that the association's membership had shown a slight gain in the past year. He also emphasized the need for intensifying the association's safety work and indicated that the founders were planning to publish soon a new safety handbook.

Mr. Hamerstadt pointed out that the association published in 1915 what was said to be the first authoritative safety handbook. He stressed the need for continued study of safety work, especially in view of the high rate of plant activity and warned against any relaxation of safety rules under the pressure of filling defense contracts.

He warned the members to

guard against inflationary tendencies and reminded them that they must always keep in mind the problem they will face after the war.

A warning that unless vigorous and energetic steps are taken at once to obtain widespread establishment of apprenticeships in plants which have been carrying on an expansion, a serious shortage may develop that will tend to halt or slow up the employment of partially skilled and unskilled workmen was voiced by W. F. Patterson, chief of apprenticeship division, U. S. Labor Department, at one of the sessions.

He said that the defense commission appreciates this danger and has undertaken steps to avoid any shortage. As an indication of the labor needs of industry under the impetus of the defense program, Mr. Patterson cited the aviation field. Today there are about 100,000 employed in aviation plants, while ultimately it will be necessary to have 500,000 to 600,000 to meet proposed production schedules.

The overall picture indicated, he said, that approximately $\frac{1}{4}$ to $\frac{1}{3}$ of the total number of productive workers needed for defense purposes will have to be all around skilled mechanics. But according to estimates, the number of apprentices now in training is less than 100,000. This number should be increased to at least 500,000 if the estimated needs of the next few years are to be met.

This country must now accomplish in one year what it had normally planned to do in 15 years. As typical of the problems caused by the defense program, Mr. Patterson mentioned the fact that the Navy yards would be required to employ 20,000 machinists within the next six months. He stressed that the Navy pledged itself to avoid poaching labor from industrial plants.

He told the founders that it was essential that the "vicious" practice of the world war of "stealing" workmen from other plants must be avoided this time and asked the foundrymen to report immediately to the Defense Commission any evidence indicating poaching, either by private plants or government arsenals, etc.

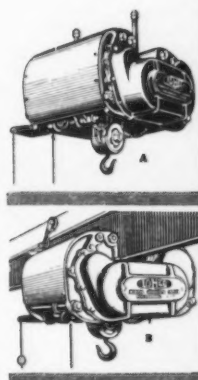
Mr. Patterson said studies had

indicated that proposals that the government offer subsidies to encourage training were not desirable as they involved an element of government compulsion which it was preferable to avoid.

Apprenticeship is "industry's problem and must be solved by industry" he said. To assist industry in this effort, the Defense Commission has organized the Federal Committee on Apprenticeship,

with about 100 field men available to industry for advice and assistance in organizing and furthering apprentice plans.

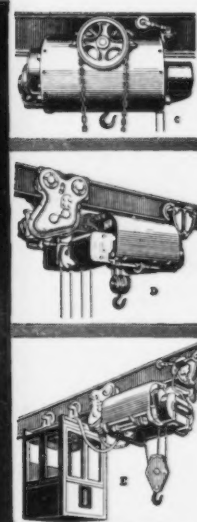
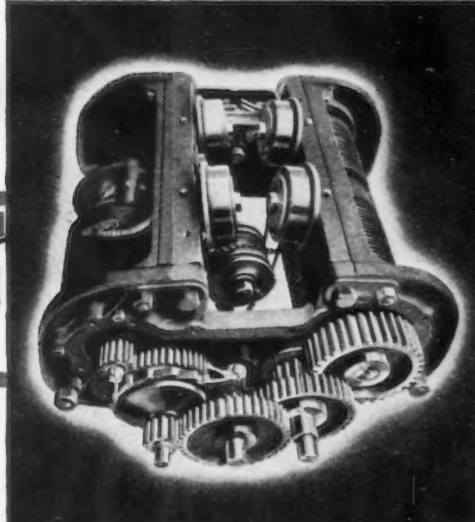
Other speakers on the program included James A. Emery and Harry L. Coe, National Association of Manufacturers; Dr. Gerald Wendt; M. S. Rukeyser, Hearst Newspapers; G. Olson, National Founders Association, and E. L. Berry, Link-Belt Co.



THERE'S A LO-HED ELECTRIC HOIST FOR EVERY PURPOSE

A—Bolt Suspension Type.
B—Plain Trolley Type.
C—Hand-Geared Type.
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CAPACITIES FROM $\frac{1}{2}$ TO 12 TONS



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Low headroom is probably the greatest single advantage a hoist can have though, like the fourth gear on your car, you may not always use it. As long as you want it, and it costs no more to have, insist on low headroom. LO-HED is the all purpose hoist with the original low headroom feature.

Low headroom in a Lo-Hed is achieved by a unique type of construction in which the weight of motor and drum are neatly balanced on opposite sides of the rail, so that the hook can be pulled up between them. Take a look at this time-tested principle in the open-view of the Lo-Hed Hoist on this page. Then check carefully all these

other time-tested features you gain when you buy a Lo-Hed: Heavy duty type hoist motor, automatic lowering brake, anti-friction bearings, stub tooth spur gears, plow-steel cable, 100% positive automatic upper limit stop, dust and moisture-proof controller. (Construction varies slightly for classes of Lo-Hed.)

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Government Awards . . .

Government awards for the week ended Nov. 9, as listed by the Public Contracts Division, Department of Labor, follow:

Navy Bureau of Supplies and Accounts:

Automatic Transportation Co., Div. of Yale & Towne Mfg. Co., Chicago: trucks, electric, low lift, \$5,641.

Bausch & Lomb Optical Co., Rochester, N. Y.: binoculars, prismatic, \$133,875.

Boston Insulated Wire & Cable Co., Boston: cable, electric, \$5,737.

Bullard Co., Bridgeport, Conn.: mills, boring vertical, \$31,207.

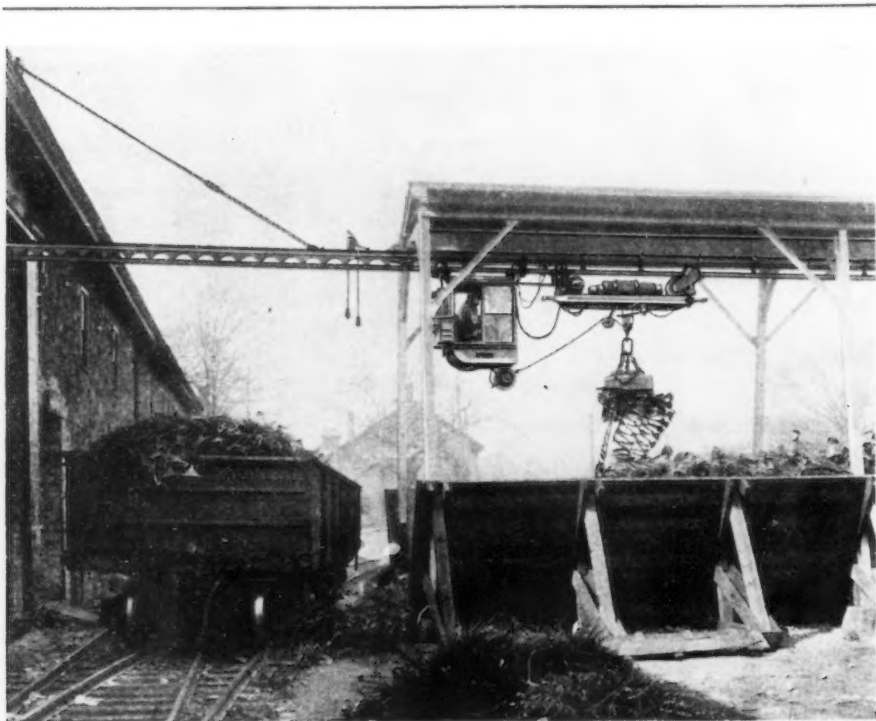
Chicago Pneumatic Tool Co., Philadelphia: drills and grinders, pneumatic, \$29,663.

Cincinnati Shaper Co., Cincinnati: machines, press brake, \$19,244.

Cincinnati Shaper Co., Cincinnati: machines, shear, squaring, \$12,459.

Cincinnati Shaper Co., Cincinnati: machine, squaring, shears, \$5,859.

Circle Wire & Cable Corp., Maspeth, L. I.: cable, electric, \$5,301.



LOW-COST SCRAP HANDLING

With a Cleveland Tramrail magnet-handling carrier, hard-to-handle scrap can be moved inexpensively from the shop floor to the storage bins and car. Through manipulation of simple controls, the cab operator can easily handle many tons of scrap every hour.

The Tramrail System illustrated, includes a jib crane over the railroad track which may be swung against the wall when not in use. Interlocks make it possible to securely lock the jib crane into position so the Tramrail carrier can be operated safely between the plant and bins.

Give us your materials handling problem. Nine chances out of ten we can show you the way to real dividends with a small investment.



CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1115 Depot Street Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Other products: CLEVELAND CRANES and STEELWELD MACHINERY

Consolidated Aircraft Corp., San Diego: airplanes, \$18,529,500.

Crane Co., Washington, D. C.: valves, \$22,827.

Curtiss Wright Corp., Curtiss Aeroplane Div., Buffalo, N. Y.: airplanes, \$29,139,793.

Electric Storage Battery Co., Washington, D. C.: batteries, storage, \$37,305.

Electric Storage Battery Co., Washington, D. C.: batteries, submarine, spare parts for, \$11,519.

Enterprise Foundry Co., San Francisco: weights, stretcher, \$13,800.

Foster Wheeler Corp., New York: pipe, brass, \$176,962.

Hardinge Brothers, Inc., Elmira, N. Y.: lathes, bench, \$9,621.

Hyde Windlass Co., Bath, Me.: windlasses, electric hydraulic type, \$58,000.

Independent Pneumatic Tool Co., Chicago: drills and hammers, pneumatic, \$5,057.

Ingersoll-Rand Co., New York: drills, grinders and hammers, pneumatic, \$54,637.

Leland-Gifford Co., Worcester, Mass.: machines, drilling sensitive, \$13,860.

Lodge & Shipley Machine Tool Co., Cincinnati: lathes, engine, \$14,141.

McQuay, Inc., Minneapolis: heaters and radiators, \$6,516.

Millers Falls Co., Greenfield, Mass.: braces, ratchet, \$5,620.

Montgomery & Co., Inc., New York: drills, hand, \$12,204.

Mosler Safe Co., Hamilton, Ohio: safes, burglar resisting, \$14,415.

National Electric Products Corp., Pittsburgh: cable, electric, \$11,409.

Niagara Machine & Tool Works, Buffalo: machines, shear, squaring, \$7,828.

Okonite Co., Passaic, N. J.: cable, \$12,284.

Peck, Stow & Wilcox Co., Southington, Conn.: braces, ratchet, \$15,134.

Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire Div., New York: cable, \$74,412.

Henry Prentiss & Co., Inc., New York: machines, drilling, \$29,408.

Scovill Mfg. Co., Waterbury, Conn.: tubes, condenser, copper-nickel alloy, \$93,814.

Sperry Gyroscope Co., Inc., Brooklyn, N. Y.: equipments, gyro compass, \$82,829.

Stone Heating & Ventilating Co., Washington, D. C.: fans, electric, \$34,378.

Swind Machinery Co., Philadelphia: machines, squaring shears, \$62,673.

Taylor-Parker Co., Inc., Norfolk, Va.: drills, hand, \$24,263.

Verson Allsteel Press Co., Chicago: machines, press brake, \$7,472.

Willard Storage Battery Co., Cleveland: batteries, storage, \$52,146.

Williams & Wells Co., New York: indicators, test, universal, \$30,366.

Watson-Stillman Co., Roselle, N. J.: machines, pipe bending, \$11,775.

Zimmer Splint Co., New York: litters, aluminum, \$12,960.

Ordinance Department:

American Locomotive Co., Railway Steel-Spring Div., New York: artillery material, \$1,204.

American Rolling Mill, Middletown, Ohio: strip steel, \$2,565.

Armstrong Cork Co., Pittsburgh, Pa.: artillery ammunition components, \$414,760.

Barber-Colman Co., Rockford, Ill.: grinding machines, \$3,556.

Briggs & Stratton Corp., Milwaukee: artillery ammunition components, \$276,250.

Budd Wheel Co., Detroit: artillery ammunition components, \$405,760.

Carter Carburetor Corp., St. Louis: artillery ammunition components, \$259,534.

Central Steel & Wire Co., Griffin Mfg. Co., Erie, Pa.: strip steel, \$27,989.

Cincinnati Ball Crank Co., Oakley, Cincinnati: compressors, grease, portable, \$2,352.

Cleveland Universal Jig Co., Cleveland: machinery, \$1,646.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.: small arms material, \$2,400.

Diebold Safe & Lock Co., Canton, Ohio: armor plate, \$1,083.

Henry Disston & Sons, Tacony, Philadelphia: armor plate, \$2,378.

NEWS OF INDUSTRY

Electric Wheel Co., Quincy, Ill.; trailers, \$2,575.

O. L. Engstrom, New York; dies, \$1,149.

Ever-Tite Mfg. Co., Davenport, Iowa; guards, angles, mud guards, etc., \$18,934.

G. M. C. Mfg. Co., Long Island City, N. Y.; artillery ammunition components, \$84,900.

J. W. Moore Machine Co., Everett, Mass.; gages, \$2,620.

Morgan Machine Co., Inc., Rochester, N. Y.; machinery, \$4,094.

National Forge & Ordnance Co., Irvine, Warren Co., Pa.; forgings, \$139,633.

Herman Nelson Co., Moline, Ill.; automotive equipment, \$1,636.

Norma-Hoffmann Bearings Corp., Stamford, Conn.; ball bearings, \$1,652.

Oliver Machinery Co., Grand Rapids, Mich.; lathes, \$3,697.

Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.; machinery, \$75,058.

Southern States Equipment Co., Birmingham, Ala.; artillery ammunition components, \$449,534.

Smith Bros. Mfg. Co., Findlay, Ohio; artillery ammunition components, \$128,384.

Chas. C. Stewart Machine Co., Birmingham, Ala.; ammunition components, \$2,041.

Stewart-Warner Corp., Chicago; artillery ammunition components, \$352,227.

Timken-Detroit Axle Co., Wisconsin Axle Div., Oshkosh, Wis.; automotive parts, \$33,611.

Uchtorff Co., Davenport, Iowa; automotive equipment, \$2,396.

Union Twist Drill Co., Athol, Mass.; cutters, \$1,596.

Wallace Supplies Mfg. Co., Chicago; manifold exhaust assemblies, \$21,830.

Air Corps:

Bendix Aviation Corp., Pioneer Instrument Div., Bendix, N. J.; indicators and transmitters, \$6,393,220.

J. Laskin & Sons Corp., Milwaukee; sheep shearing, \$707,410.

Sperry Gyroscope Co., Inc., Brooklyn, N. Y.; mount assembly filter, oil regulators, \$3,484,522.

Iron & Steel Products:

Albert Pipe Supply Co., Inc., Brooklyn, N. Y.; steel pipe, \$20,813.

American Chain & Cable Co., Inc., Bridgeport, Conn.; cores, \$21,350.

Babcock & Wilcox Tube Co., Beaver Falls, Pa.; steel tubing, \$299,933.

E. Behringer Sheet Metal Works, Inc., Newark, N. J.; shells, \$56,330.

Blackhawk Mfg. Co., Milwaukee; jack assemblies, \$178,815.

Blackhawk Mfg. Co., Milwaukee; jacks, \$19,304.

S. Blickman, Inc., Weehawken; galley tubs, \$29,950.

Boston & Lockport Block Co., East Boston, Mass.; block sheaves, \$13,642.

Builders Iron Foundry, Providence, R. I.; tubes, \$12,382.

Bunell Machine & Tool Co., Cleveland; vise, \$19,393.

Case Crane & Kilbourne Jacobs Co., Columbus, Ohio; dish cart, \$10,363.

Ceco Steel Products Corp., Chicago; wire fabric, \$18,940.

Central Steel & Wire Co., Chicago; strip steel, \$29,989.

Cleveland Pneumatic Tool Co., Cleveland; couplings, \$18,889.

Consolidated Supply Co., Portland, Ore.; valves, \$51,840.

Doehler Die Casting Co., Pottstown, Pa.; angletubes, \$200,565.

Fairmount Tool & Forgings Co., Cleveland; motor maintenance equipment, \$76,684.

Joshua Hendy Iron Works, San Francisco; gate assemblies, \$19,570.

Hunter Steel Company, Pittsburgh; support towers, \$33,115.

Irwin Auger Bit Company, Wilmington, Ohio; motor maintenance equipment, \$22,402.

Kilby Steel Co., Anniston, Ala.; tool brackets, \$71,489.

Lancaster Iron Works, Inc., Lancaster, Pa.; steel pipe, \$22,308.

Mergenthaler Linotype Co., Brooklyn, N. Y.; telescope mounts, \$1,194,710.

Midvale Co., Nicetown, Philadelphia; forgings, \$8,121,125.

National Casket Co., Inc., Long Island City, N. Y.; metal caskets, \$32,812.

National Pneumatic Co., Inc., Rahway, N. J.; tubes, \$178,300.

Pittsburgh Screw & Bolt Corp., Pittsburgh; bolts, \$12,631.

Poor & Company, Canton, Ohio; drop forgings, \$49,022.

Republic Steel Corp., Massillon, Ohio; steel, \$68,856.

Schubert-Christy Corp., St. Louis; water cooling tower, \$23,180.

Service Tool & Engineering Co., Dayton, Ohio; testing sets, \$215,213.

Sherman Supply Co., Seattle; valves, \$21,414.

Standard Pressed Steel Co., Jenkintown, Pa.; cores, \$290,190.

Tomkins-Johnson Co., Jackson, Mich.; rivet setting machines, \$12,920.

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20
HOURS
SAVED
HERE



Riveting Anvil Part for a large gun manufacturer, made by Connecticut Tool & Engineering Co., Bridgeport, Conn. It took a little less than 4 hours, including set-up time, to saw out the four anvils from machine steel. This meant a saving of 5 hours on each piece, as compared with milling.

FASTEST METAL CUTTING MACHINE

The DoAll offers industry the fastest method of cutting internal and external shapes from any metal up to 10" thick. Replaces shaping, milling and lathe work, and effects unprecedented savings of time, labor and material.

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STEEL ROOFING AND SIDING

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PRECISION INDUSTRIAL SCREENS

ANY METAL

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- Perforated metal is for a thousand uses, some of which require precision workmanship to accomplish results otherwise impossible.
- Whatever you require in perforated metal, we are here to produce, either the commonplace, the difficult, or the precision. Your inquiries will have our best attention.

The Harrington & King Co.
PERFORATING

5657 FILLMORE ST., CHICAGO **114 LIBERTY ST., NEW YORK**

Wallace Supplies Mfg. Co., Chicago; manifold exhaust, \$21,830.

Weaver Mfg. Co., Springfield, Ill.; motor maintenance equipment, \$34,433.

J. H. Williams & Company, Buffalo, N. Y.; steel forgings, \$18,545.

Wire Rope Corp. of America, Inc., New Haven, Conn.; wire rope, \$70,308.

Wright Aeronautical Corp., Paterson, N. J.; steel forgings, \$12,900.

Non-Ferrous Metals & Alloys:

Aluminum Cooking Utensil Co., New Kensington, Pa.; aluminum pots, \$33,243.

Aluminum Products Co., LaGrange, Ill.; aluminumware, \$43,459.

American Brass Co., Waterbury, Conn.; brass pipe, \$11,223.

American Brass Co., Waterbury, Conn.; cartridge cups, \$1,067,140.

American-LaFrance-Foamite Corp., Elmira, N. Y.; fire extinguisher, \$66,903.

American Smelting & Refining Co., San Francisco; pig lead, \$166,760.

C-O-Tow Fire Equipment Co., Newark, N. J.; extinguishers, fire, \$47,208.

Eclipse Machine Division, Bendix Aviation Corp., New York; time fuses, \$10,218,000.

Walter Kidde & Company, Inc., New York; fire extinguishers, \$13,777.

Pacific Metals Co., Ltd., San Francisco; nickel-copper-alloy, \$14,980.

Revere Copper & Brass, Inc., Baltimore; cartridge cups, \$751,666.

Scovill Mfg. Co., Philadelphia; 5c. blanks, \$107,500.

Machinery:

American Chain & Cable Co., Inc., Wright Mfg. Div., York, Pa.; hoist, \$38,077.

Aldrich Pump Co., Allentown, Pa.; pumps, \$29,960.

American Laundry Mach. Co., Cincinnati; washing machines, \$10,036.

American Locomotive Co., Schenectady, N. Y.; turret rollers, \$144,978.

Caterpillar Tractor Co., Peoria, Ill.; tractors, \$36,718.

Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, \$15,394.

Cincinnati Milling Mach. & Cincinnati Grinders, Inc., Cincinnati; milling machines, \$319,431.

Cincinnati Shaper Co., Cincinnati; shear machine, \$10,920.

Diagraph Bradley Stencil Mach. Corp., St. Louis; stencil machines, \$10,120.

Fairbanks, Morse & Co., St. Louis; pumping units, \$37,160.

Farrel-Birmingham Co., Inc., Ansonia, Conn.; rolling mill units, \$53,600.

Fogel Refrigerator Co., Philadelphia; refrigerators, \$42,750.

General Motors Corp., Cleveland Diesel Eng. Div., Cleveland; engine spares, \$14,580.

Hamilton Tractor & Equip. Co., Chattanooga; tractors, \$15,433.

Ideal Stencil Machine Co., Belleville, Ill.; stencil machine, \$12,305.

Lodge & Shipley Mach. Tool Co., Cincinnati; lathes, \$60,591.

McCray Refrigerator Co., Kendallville, Ind.; refrigerators, \$100,838.

Morse Chain Company, Detroit, Mich.; parts for diesel engines, \$38,891.

Pratt & Whitney Div., Niles-Bement-Pond Co., W. Hartford, Conn.; drilling machines, \$18,930.

Seeger Refrigerator Co., St. Paul, Minn.; refrigerators, \$534,655.

Wm. Sellers & Co., Inc., Philadelphia; boring mill, \$78,730.

Servel, Inc., New York; refrigerators, \$12,724.

Sidney Machine Tool Co., Sidney, Ohio; lathe, \$12,762.

Standard Steel Works Div. Baldwin Locomotive Works, Philadelphia; rollers, \$146,073.

Tavares Construction Co., Inc., Los Angeles; pile driver, \$23,400.

Warner & Swasey Co., Cleveland; lathes, \$28,683.

Wilson-Brown, Inc., New York; squaring shear, \$18,325.

Wilson-Weesner-Wilkinson Co., Knoxville; tractors, \$12,587.

Outlaw Strike at Crucible Plant Ends

Midland, Pa.

••• Employees of Pittsburgh Crucible Steel Co. here late last week voted to end their six-day outlaw strike and return to work pending the handling of grievances in accordance with the signed contract between Crucible and the SWOC. Approximately 4000 workmen had walked out in violation of their contract, which action was disavowed and condemned by SWOC officials. The strike directly affected the products slated for national defense and the vote had been preceded by conferences between the company, government labor conciliators, and SWOC officials.

International officers of the SWOC had instructed the men to return to work but the feeling ran so high in the mill that the ballot box was resorted to and it was said that the vote stood 52 per cent in favor of returning to work and 48 per cent opposed.

Company spokesmen said that James Dewey and Thomas Lambert, conciliators for the U. S. Department of Labor who assisted in mediating the dispute, would be invited to participate in the grievance negotiations.

Airplane Pump Backlog Climbs For Romec Co.

Elyria, Ohio

••• Romec Pump Co. reports unfilled orders increased from \$30,000 July 1 to more than \$275,000 Oct. 31. The company, which manufactures fuel and vacuum pumps, hydraulic pumps, air compressors and hand emergency pumps mostly for airplane companies, was discharged from bankruptcy July 19.

Central Pattern & Foundry To Lift Output By 30%

Chicago

••• Production increase of 30 per cent will be achieved by Central Pattern & Foundry Co. here with a \$20,000 expansion to be completed this month. Increase of 30,000 sq. ft. of floor space will accommodate the expected production step-up.

JESSOP STEELS for NATIONAL DEFENSE

★ ★ Tool Steels for Machining Armaments
Aircraft Quality Bars, Sheets and Plates
Light Armor Plate for Tanks and Airplanes
and other quality alloy steels and specialties ★ ★



Taking a test sample from an electric furnace at the Jessop plant.

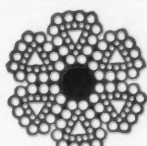
"JESSOP Sets Standards in Fine Quality STEELS"

Jessop Steel Co., 537 Green Street, Washington, Pa. EST. 1901

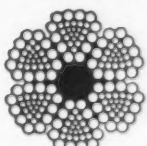


Jessop Steels of America

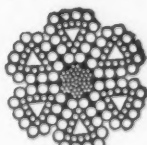
CARBON-HIGH SPEED-SPECIAL ALLOY
STAINLESS and COMPOSITE STEELS



Style B
Flattened Strand



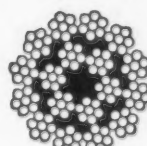
"B"
Flattened Strand



Wire Rope Center



Steel Clad



18x7
Non-Rotating

You Can Depend On "HERCULES" (Red-Strand) Wire Rope...

There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close co-operation with users.

—PREFORMED—

For maximum efficiency in Preformed Wire Rope, use Preformed "HERCULES". It is available in both Round Strand and Flattened Strand constructions.

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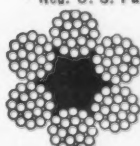
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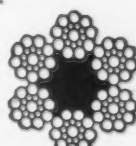
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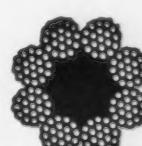
6x19
Filler Wire



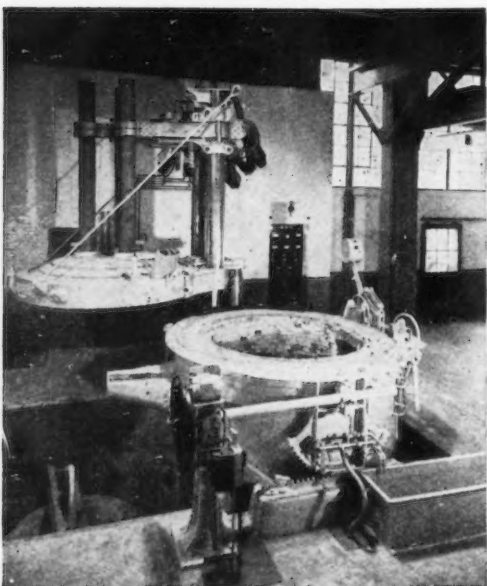
6x19
Scale



6x37
Extra Flexible



8x19
Extra Flexible

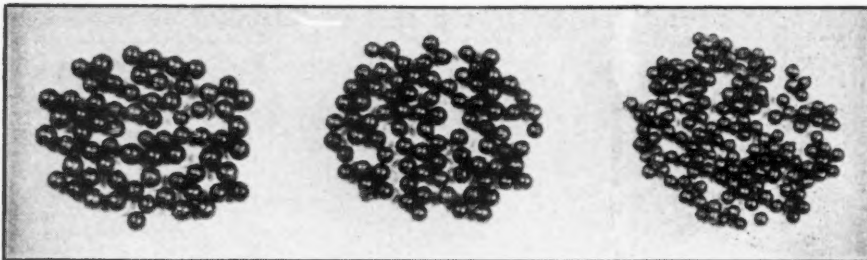


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MOORE RAPID
Lectromelt
FURNACES
for
MELTING
REFINING
SMELTING**

Illustration shows top charge type LECTROMELT furnace with roof raised and rotated to one side to permit quick charging with drop bottom bucket.

LECTROMELT furnaces offer the rapid and economic means for the production of plain carbon and alloy steel ingots and castings as well as gray and malleable irons. Top charge and door charge types are both available. LECTROMELT furnaces are built in standard capacities from 25 pounds to 100 tons. Write for details.

PITTSBURGH LECTROMELT FURNACE CORP.
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HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

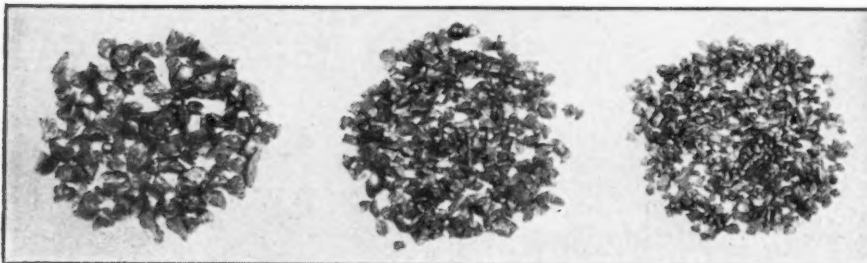
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

HEAT-TREATED STEEL GRIT

MANCHESTER, NEW HAMPSHIRE



Wage Act Unaffected By Union Agreement

Washington

••• Wage-Hour Administrator Fleming has ruled that a clause in a union contract providing for a workweek of more than 40 hr. without the payment of overtime does not relieve the employer from the necessity of paying a rate of time-and-one-half in accordance with the provisions of the Act.

Colonel Fleming recognized that there would be certain exceptions under Section 7 (b) of the law, but pointed out that should the 1000 or 2000 hr. maxima fixed by that section be exceeded, "overtime is due the employees for all hours in excess of 40 in any given workweek." The statutory standards may not be lowered by any kind of agreement, he said.

Westinghouse Defense Backlog At \$93,779,000

Pittsburgh

••• Involving more than 245 orders, some of which will not be delivered before 1943, national defense business at Westinghouse Electric & Mfg. Co. amounts to approximately \$93,779,000, according to George Bucher, president. Much of the equipment is slated for industrial concerns which are expanding their own plant facilities because of the national defense program.

Copperweld Furnaces Ready In January

••• S. E. Bramer, president of Copperweld Steel Co., Warren, Ohio, producers of Copperweld, copper-covered steel wire and rod, and Aristoloy alloy steels, announces that construction is well under way on one additional 25-ton and one additional 10-ton top charging electric furnace at the company's Warren alloy steel plant. Upon completion of these two new furnaces in January, 1941, the company will have in operation three 25-ton furnaces and one 10-ton furnace for the production of all grades of alloy steels.

Mr. Bramer also stated that the company had recently added two additional heat-treating furnaces.

New NLRB Head Backs 10-12 Hr. Day if Needed

• • • Workers in U. S. industry should accept an increase to 10 or 12 hr. in the working if defense efforts make this necessary, Dr. Harry A. Millis, newly-appointed member of the National Labor Relations Board, believes.

Dr. Millis, who is expected to become the board's chairman, suc-



DR. HARRY A. MILLIS, professor emeritus of economics at the University of Chicago, has been appointed a member of the National Labor Relations Board and is expected to become the board's chairman.

ceeding J. Warren Madden, said in an interview that under ordinary circumstances 40 hr. a week is enough for any person to work. "Where the work isn't fun, the worker is under a nervous strain and needs leisure," he said. "There is no reason why people should live merely to work. But when an emergency situation arises it is up to everyone to buckle down and work whatever hours are needed."

Dr. Millis is professor emeritus of economics at the University of Chicago.

BOAT WANTS WATER—



Do you think this boat will get a job? Any more than will the man who advertises "Man wants job?"

No boat will be put to work until boats are needed. Neither will men be put to work until men are needed.

For years we have been trying to solve the unemployment problem from the standpoint of men who need jobs.

It's time we actually solved it by realizing that today jobs need men.

The job of National Defense Production, plus the demand for a substantial increase in the normal wants of our people, will call for the help of every able bodied man and woman in these United States.

The defense program contains the solution to the unemployment problem. Why wait?

Industry may be handicapped because so many of the unemployed are not trained. We can train them. We are training them. And we are going to train enough more men to float our boat over the high tide of National Defense Production . . . and at the same time satisfy the wants of our people.

Geo. T. Trundle Jr.

THE TRUNDLE ENGINEERING COMPANY *Consulting Management Engineering*

General Offices

CLEVELAND • BULKLEY BUILDING

CHICAGO

City National Bank Building
208 South La Salle Street

NEW YORK

Graybar Building
420 Lexington Avenue

Cold Metal Pays \$500 Dividend Per Share

Youngstown

••• Cold Metal Process Co. here has paid a dividend of \$500 on each of 2000 outstanding stock shares. It is estimated the total distribution of \$1,000,000 represented about one-third of the cash settlement received from United States Steel Corp. on past royalties on the Steckel patents. Less than 20 persons own all the Cold Metal Process stock.

Cold Metal Process also liquidated most, if not all, of its outstanding debts, including amounts owed to Bessemer Securities Co. and Standard Slag Co.

Purvis, British Purchasing Head in U. S., Visits England

••• Arthur B. Purvis, director-general of the British Purchasing Commission, left Saturday, Nov. 16, on the Dixie Clipper for Europe to obtain first-hand information on England's present war needs. Mr. Purvis has directed British purchases of nearly \$4,000,000,000 in the U. S. during the last year. He expects to return to the U. S.

R. H. Smith Reports Plane Plants on Coast Booming

Cleveland

••• The upsurge of activity in the Western aircraft industry is being reflected all along the Pacific Coast, reported R. H. Smith, president of Lamson & Sessions Co., who, accompanied by A. E. R. Peterka, executive engineer, returned to Cleveland this week after an extensive tour of plants from Seattle and Portland to Los Angeles and San Diego.

With plant space and payrolls growing so rapidly, construction of new buildings, including even dwellings, garages and restaurants, has been stimulated greatly, he explained. Some aircraft firms have had a difficult time training new employees fast enough.

"There are interesting developments everywhere out there in this exceedingly vital industry," said Mr. Smith. "Changes are rapid—airplane designs are sometimes

obsolete even before the jigs have been completed. The industry is free of inhibitions, and I was impressed by the fine corps of able executives out there."

All materials for aircraft plants must be supplied with diligence and in positive alignment with specifications, said Mr. Smith. A highlight of his trip was inspection of the new giant Douglas bomber, which is larger than any previous bomber.

October Machine Tool Index Advances to 97%

••• Machine tool output in October was double that of October, 1939, and productive capacity of the industry, already up 50 per cent in a year, is still expanding, according to F. V. Geier, president of the National Machine Tool Builders' Association, and president of the Cincinnati Milling Co.

Mr. Geier's comment accompanied release of the association's operating index showing the industry's operating rate in October as 97 per cent against 95 per cent in September.

"The industry is meeting the country's defense needs by increased operating schedules and by extensive plant expansion," said Mr. Geier. "The industry's productive capacity has been substantially increased in the past year by these four steps: (1) the addition of floor space; (2) the installation of more equipment and better utilization of existing equipment; (3) by increased employment and employee training; and (4) by sub-contracting parts to qualified machine shops."

Woodward Will Air Condition 3rd Stack

Birmingham

••• Woodward Iron Co. has let contract for air conditioning the company's third blast furnace to Shook & Fletcher Supply Co.

Company officials said air conditioning has increased pig iron output of Woodward's two other furnaces by 10 per cent during the seven or eight months of the year air conditioning is used. They said it also has reduced coke requirements of the furnaces by approximately 200 lb. per ton of iron ore.

1800 Technicians To Be Trained at Pittsburgh

Pittsburgh

••• Early in December the University of Pittsburgh and Carnegie Institute of Technology here will offer special new short-term free tuition courses for training some 1800 men for specific technical jobs in defense industry.

This program is part of the national program and is supported through an allotment of \$9,000,000 recently voted by Congress in the supplementary defense appropriation account. The program is being carried out through 22 districts in the United States, district No. 11 comprising Western Pennsylvania, Western Maryland, and West Virginia. Pitt, Carnegie Tech, Penn State, Bucknell, Grove City College, and the University of West Virginia.

Officials of these institutions met here last week with personnel representatives of such key companies as U. S. Steel, Aluminum Co. of America, Westinghouse Electric & Mfg. Co., and Jones & Laughlin Steel Corp.

The two-fold purpose of the program outlined by Dr. H. P. Hammond, Penn State, was: To train men now employed for adaptation to new jobs; and to give young men pre-employment training.

Dean Hammond declared, "This is not any six months' defense program, but a four or five year thing. After June next there'll be new demands by industry—and already demands for next June's engineering graduates are the greatest I have ever known."

According to Dean Hammond, rough surveys have indicated that between 7000 and 7500 technical jobs in defense industries, 2600 of them in the Pittsburgh area alone, will have to be filled by June.

John D. Beatty, head of Carnegie Tech industrial relations, warned Pittsburgh industries that the available personnel supply is not as great as supposed and pointed out that Army and Navy Ordnance Departments, not to mention hundreds of expanding private concerns, will soon be taking away key men by the thousands.

Shortage of Synthetic Materials Studied

Detroit

••• Upsetting a popular notion that technicians can forestall the possible ill effects of a shortage in rubber for automotive and industrial purposes by substituting synthetic materials, discussion at the November meeting of the Society of Automotive Engineers, Detroit Section, reveals that synthetics themselves are so much in demand for special applications in the defense program that there is likely to be a shortage of synthetics, although expansion programs are underway now to provide greatly increased capacity for the manufacture of the synthetic materials.

Synthetics such as Thiokol, Neoprene, Ameripol (Hy-carb) and forms of Butyl rubber and Buna rubber, are used for special applications in aircraft and in other branches of the defense industry because of attributes which natural rubber does not have, for instance, resistance to effects of oil and gasoline.

Led by W. J. McCortney, engineer in charge of the rubber and plastics laboratory of Chrysler Corp., five other technical experts participated in a forum on "The Economics of Substituting Synthetic Rubber in Automobiles." Others who participated were J. W. Crosby, manager of technical service, Thiokol Corp., Trenton, N. J.; E. R. Bridgewater, head of the rubber chemicals division of the duPont Co., Wilmington, Del.; Dr. Waldo L. Semon, research director of the Hydro-Carbon Chemicals, Inc., Akron; I. E. Lightbown, head of the technical service on synthetic rubber in the commercial rubber department of Standard Oil Co. (New Jersey) and R. P. Dinsmore, technical director, Goodyear Tire & Rubber Co., Akron.

All of the experts pointed out, however, that the increased demand for synthetics per se would increase productive capacity so it would be available for providing substitute materials to be used in tires for automobiles. Also, low-priced synthetics, even though higher in price than natural rubber, would put an effective ceiling on the price level of natural rub-

ber. Instability in price and in availability of natural crude has been an important factor in the development of rubber substitutes and the technical development of the synthetics industry has helped to offset the artificial restrictions in international rubber trading.

The price structure of rubber has varied in the last 20 yr. from 75c. per lb. to 2½c. per lb., largely due to artificial restrictions. The high in 1910 was \$3.06 per lb. It is estimated now that crude rubber may be produced on plantations for a profit at 6 to 10c. per lb., according to Mr. McCortney.

The papers presented in the symposium included a wealth of technical data on the physical characteristics of various synthetics, comparisons with natural rubber, their abilities to be bonded to steel or other metals and the availability of the raw materials from which the synthetics are made. At present the average cost of synthetics is about 60c. per lb., leading to the conclusion that "at the present time its use as a favored material in its own right is paramount," according to Mr. McCortney, who added that he did not think that the time has yet come "when we can consider synthetic rubber for tires."

Use by Chrysler Corp. of more than 100,000 lb. of synthetic rubber per month, one-eighth of the American capacity to produce synthetic rubbers, was reported.

Steel Buyers Must Furnish Proof of Priority Right

••• Some steel buyers are sending orders to steel companies marked "Government priority," or words to that effect, without furnishing official certification that such is actually the case. Most of the steel companies give no special attention to such statements on orders, but merely let the orders take their course along with all other commercial business. One large company, however, has prepared its own forms which are sent to any company which specifies that its order should have priority, asking that the form be filled out and certified by the proper government department or official. Buyers are being told that they will save themselves delays if they obtain certification in

286 Allison Engines Built in October

••• The Allison Division of General Motors Corp., manufacturers of liquid-cooled engines for military airplanes, delivered 286 completed engines in October. C. E. Wilson, acting president of General Motors, announces. In September, 223 engines were delivered, following production of 73 in July and 65 in August. This total of 647 engines compares with a total of fewer than 100 manufactured prior to July, 1940.

advance of placing an order and send this along with the order. There are still no official priorities on steel except that requests of government departments or officials in charge of government projects for preference are accorded the earliest possible place on delivery schedules.

Greece Short of Steel; No Shipments Since June

Washington

••• With virtually all sources cut off, Greece is facing an increasingly acute shortage of iron and steel products. Commerce Department reports show that since June practically no shipments have arrived in the Greek market.

Greek-flag vessels attempted, last August, to bring in 1200 tons of steel from the United States but the shipment was seized by Italian authorities. Other shipments reportedly en route from the United States stand little chance of reaching Greece where, the report said, the government has requisitioned considerable quantities of concrete reinforcing bars and steel sheets.

American Company's Plant At Coventry, Eng., Resumes

••• Officials of the Torrington Co., Torrington, Conn., manufacturers of needles, bicycle parts and a line of metal specialties received word Nov. 16 from Coventry, England, that the firm's plant there was damaged in the terrific aerial raid on the midlands city, but would be able to resume operations Monday, Nov. 18.

Council Elects Ralph Flanders, Hears Olds Plead for U. S. Unity

• • • Sole purpose of the government's expenditure of vast sums for preparedness is to make the U. S. reasonably safe from attack, Irving S. Olds, chairman of U. S. Steel Corp., said last week before the New England Conference at Boston. "I am confident," he said, "that Congress has not sanctioned the staggering defense appropriations of recent months in an endeavor to set up the government in business in general competition with private industry when the international situation has again become normal."

"That would be state socialism on a broad front," said Mr. Olds, "and the probable death of the system of free enterprise which has made this country the envy of the industrial world."

The U. S. Steel chairman pleaded for a coalition of all interests, and urged the country to rid itself of "partisan politics, class hatred, and of imagined hatred of capital toward labor or vice versa."

The New England Conference elected Ralph E. Flanders, president of Jones & Lamson Machine Co., Springfield, Vt., as president of the council, succeeding Winthrop L. Carter. Mr. Flanders told the conference that it "would be a national scandal, a sign of gross mismanagement if, in the face of unlimited defense orders, we were unable to reduce unemployment to the vanishing point."

"Unless we do bring in new men," Mr. Flanders said, "we will immediately fall into the evil practice of certain periods of the last war in which each individual company undertook to expand its production by hiring men away from other companies, with no advantage to national production as a whole."

Tank Arsenal Contract Awarded at Detroit

Detroit

• • • Contract for construction of the tank arsenal which Chrysler Corp. is building for the U. S. Army was let Monday to the O. W. Burke Co., E. J. Hunt, operating manager of the plant, said.

1500 Army Trucks Ordered From Bantam

Detroit

• • • Award of contracts for 1500 80-in. wheelbase Army trucks to American Bantam Car Co., Butler, Pa., has been confirmed by Frank H. Fenn, president and general manager of the company. It is estimated that the amount of the contract is \$1,500,000. Production at the rate of 50 a day is expected to start almost immediately since tooling will not be a factor.

Plans Under Way To Rebuild Tacoma Bridge

San Francisco

• • • Plans are being formulated for reconstruction of the Tacoma Narrows Bridge, Tacoma, Wash., which collapsed in a 35-mile wind last week, but until surveys are completed no estimates will be available as to how much of the 17,000 tons of steel in the structure can be salvaged.

Contract for the construction of the bridge was awarded Sept. 27, 1938, to a combination of three West Coast firms. Steel tonnage included 10,528 tons of structural steel; 231 tons of H-piling; 200 tons of cast and forged steel; 1075 tons of sheet piling; 3800 tons of cable wire; and 1600 tons of reinforcing steel; in addition to steel required for caissons in building the piers.

Tacoma's bridge involved a number of unusual factors, four of which are:

1—Piers had to be founded beneath 200 ft. of tide water having a velocity of $8\frac{1}{2}$ miles per hr. (The two caissons for the Golden Gate Bridge, San Francisco, founded only 100 ft. beneath the surface of San Francisco Bay, had been without precedent).

2—The third largest suspension span in the world was involved, 2800 ft. It is exceeded in length only by the Golden Gate Bridge and the George Washington Bridge, New York.

3—A two-lane structure with a 2800-ft. central span involved a

width-to-span ratio of 72—in comparison with the ratio of 45 used on the Golden Gate Bridge and the still smaller ratios on other previous bridges.

4—Construction time was short—just 19 months were available.

Electric Truck Orders at Peak

• • • October bookings of electric industrial trucks and tractors were substantially higher than in any previous month this year, the Industrial Truck Statistical Association, 208 South LaSalle Street, Chicago, reports. There were 193 units booked, compared with the previous high in September of 154 units.

Total net value at factories for chassis only was \$653,682.20, compared with the previous high of July at \$591,784.44.

There were 22 non-elevating platform trucks with capacities and chassis base prices ranging from 2000 to 6000 lb., and \$1,615 to \$1,995, respectively, with a total net value at factories of \$41,974; net values shown are after additions and deductions for variations from standard specifications, trade-in allowances, etc., if applicable; 147 cantilever trucks, capacities and chassis base prices ranging from 1000 to 20,000 lb., and \$1,300 to \$7,860, respectively, had a total net value at factories of \$505,192; eight tractors, capacities and chassis base prices ranging from 475 to 2000 lb., to 600 to 3000 lb. draw bar pull, and \$1,550 to \$1,745, respectively, had a total net value at factories of \$13,541; 15 crane trucks, capacities and chassis base prices ranging from 3000 lb. at 7 ft., to 10,000 lb. at $5\frac{1}{2}$ ft. radius, and \$4,980 to \$7,450, respectively, had a total net value at factories of \$89,675.20; and one special non-load carrier truck had a total net value at factory of \$3,300.

Warehouse Convention To Be at San Francisco

Cleveland

• • • The American Steel Warehouse Association, Inc., will hold its 32nd annual convention at the Fairmont Hotel in San Francisco, May 12, 13 and 14, 1941, announces W. S. Doxsey, executive secretary. A special train from Chicago to San Francisco will be arranged for those attending from the East.

Canada Will Build \$3,000,000 Plane Plant

Ottawa, Can.

• • • Announcement was made by officials here that the Canadian government has entered into a contract with Fleet Aircraft Corp., Fort Erie, Ont., which will involve construction of a \$3,000,000 airplane plant at London, Ont. Under the terms of the contract the government will finance, erect and own the proposed plant, while it will be operated under the direction of Fleet Aircraft Corp.

Officials of the Department of Munitions and Supply announced placing of war contracts valued at \$8,433,263. Orders include:

Munitions: Anaconda American Brass, Ltd., New Toronto, \$34,260.

Machinery: Dominion Hoist & Shovel Co., Ltd., Montreal, \$46,170.

Aircraft: Aviation Electric, Ltd., Montreal, \$64,598.

Mechanical transport: Truck Engineering, Ltd., Woodstock, \$59,265.

Electrical equipment: Canadian General Electric Co., Ltd., Ottawa, \$63,191; Exide Batteries of Canada, Ltd., Toronto, \$96,457.

Instruments (technical): Air Ministry, England, \$30,000; Instruments, Ltd., Ottawa, \$45,070.

Shipbuilding: Halifax Shipyards, Ltd., Halifax, N. S., \$29,422; General Supply Co. of Canada, Ltd., Ottawa, \$55,212.

Miscellaneous: E. G. M. Cape & Co., Montreal, \$67,000; John Plaxton, Winnipeg, \$42,000; Disher Steel Construction Co., Toronto, \$125,000; Ernest A. Jones, Leaside, Ont., \$81,000; W. E. Emerson & Sons, West St. John, N. S., \$72,000; M. F. Schurman, Summerside, P. E. I., \$132,000.

Construction projects: Anglin-

Canada War Orders Reach \$443,000,000

Toronto

• • • Concrete evidence of the expansion of Canada's war industry was revealed by Prime Minister Mackenzie King in the House of Commons during the week. The Premier stated that early in November contracts placed on Canadian government account for war supplies had mounted to a total of over \$443,000,000 as against \$302,000,000 in August. In addition Great Britain had placed orders with Canadian plants to a total of \$134,000,000. Canada also had commitments for capital outlays on plant construction and extensions amounting to upwards of \$235,000,000.

Norcross, Ontario, Ltd., \$278,024; Canadian Comstock Co., Ltd., Toronto, \$229,748; Buchan Construction Co., Calgary, Alta., \$200,635; Poole Construction Co., Ltd., Regina, Sask., \$807,316; Northern Construction Co., and J. W. Stewart, Ltd., Vancouver, B. C., \$183,000; Acme Construction Co., St. John, N. B., \$493,000.

Anker-Holth Mfg. Co. Acquires New Unit

• • • George Birkenstein, Chicago, president of the Anker-Holth Mfg. Co. and the George Birkenstein Corp., announces the acquisition of the Air Grip Chuck Co., of Detroit. The airchuck business was started in 1917 by Leo T. Neidow of Chicago, and will become a division of the Anker-Holth Mfg. Co. Inc. of Port Huron, Mich., and Sarnia, Ont. The Air Grip Chuck line includes a complete line of air chucks, cylinders and valves, essential in the present defense program.

RFC Defense Loans Now Total \$14,371,214

Washington

• • • The Reconstruction Finance Corp., whose borrowing authority was hiked \$1,000,000,000 for plant construction under the defense program, has fixed an interest rate of 1½ per cent for loans on which the War or Navy Departments make definite commitments for reimbursement over a five-year period. Where there is no definite undertaking for such reimbursement the interest rate will be "appropriate to the credit factors of the individual case, but not more than 4 per cent."

Federal Loan Administrator Jesse H. Jones advised both departments by letter early this week that "substantial commitments" already have been made for defense purposes but that "ample funds" are still available. The latest RFC statement shows that for October there were total disbursements on national defense loans of \$9,471,498. This brings the total of such loans to \$14,371,214.

WPA Defense Training Doubled at Cleveland

Cleveland

• • • WPA will shortly double its defense training program for armament industries to nearly 1200 men, with classes instituted in six schools on a 24-hour basis. Current absorption by foundries and machine shops of WPA workers from their classes at the rate of five to ten men a day accounts for the decision to double the WPA defense program, as well as preparations to meet demands of defense industries, which are being constantly geared to a higher pitch, it was said.

GEOGRAPHICAL DISTRIBUTION OF DEFENSE ORDERS UP TO NOV. 1

(As listed by National Defense Advisory Commission—000's omitted)

	Ordnance	Ships	Aircraft	Construction	Miscellaneous	Totals
New England	\$158,833	\$861,268	\$134,403	\$112,146	\$55,823	\$1,322,478
Middle Atlantic	419,519	1,046,641	217,724	80,686	325,657	2,090,227
North Central	390,574	96,430	190,149	91,348	245,198	1,013,699
South Central	52,051	116,894	1,960	149,258	12,582	332,655
South Atlantic	137,366	590,338	229,918	170,168	43,407	1,171,197
Pacific Mountain	13,046	518,657	725,337	126,856	12,846	1,396,600
Territories		720		619	124	1,437
Unassigned	66,566	934	2,963	30,479	109,209	210,141

Girdler Sees Steel At Capacity Through '41

Cleveland

• • • The steel industry can be expected to run at full capacity through 1941, said T. M. Girdler, chairman of Republic Steel Corp., at a press conference here Nov. 19. It will be the middle of next year before anyone can accurately gage the per cent of steel production going into the defense program, he continued. British buying is increasing constantly and their tendency to buy more finished steel than semi-finished is natural under current conditions, he said.

Republic is not planning any large expansions other than what has already been announced, explained Mr. Girdler.

Questioned as to the truth of John L. Lewis's pre-election intimation that Republic may be negotiating a contract with the SWOC, Mr. Girdler said, "There is nothing to it whatever. We have done nothing about a contract and there is nothing on the subject to say in any way, shape or form."

Directors of Republic Steel Corp. Nov. 19 authorized the setting aside of \$6,300,000 into a fund provided for in the certificate of incorporation for the purchase of 6 per cent cumulative convertible preferred stock of the corporation. The amount set aside is equal to slightly more than one-half of the par value of the 119,597 outstanding shares of the 6 per cent cumulative convertible preferred stock. The action does not apply to the 6 per cent cumulative convertible prior preference stock, series A, of which there are 282,303 shares outstanding.

NLRB Examiner "Gives Notice" To Plant Union

Chicago

• • • The first instance, within his knowledge, of an examiner for the NLRB going into a company's plant and stating that he was there to destroy an existing independent union, was cited by Circuit Judge J. Earl Major, in writing the decision of the U. S. Circuit Court of Appeals which nullified an NLRB order directing the A. E. Staley Mfg. Co., Decatur,

Ill., to withdraw recognition of an independent union. L. J. Disser, labor board examiner, investigating union activities at the plant in March, 1938, told company officials they "had maintained such good wages and excellent working conditions that the AF of L had nothing to promise employees," Judge Major pointed out in the decision.

Plaques Awarded After Purchasing Exhibit

Cleveland

• • • The Midwest Purchasing Exhibit, presented by the Purchasing Agents Association of Cleveland, at Hotel Cleveland, closed Nov. 16 after plaques were awarded to four companies for outstanding displays. The exhibit of the Marbott Weld Co. was judged the most informative display among those offered by Cleveland exhibitors.

Plaques also were given the Reliable Steel Plate Co., and the Youngstown Sheet & Tube Co. The Reliable Steel Plate exhibit was judged the most original in the show and Youngstown Sheet & Tube's was chosen as the most attractive.

Aeronautical Products, Inc., Again Expands Plant

Detroit

• • • Aeronautical Products, Inc., 18100 Ryan Road, Detroit, is starting another plant addition at a cost of \$35,000. Most of this will be spent for new equipment.

Rockford, Ill.

• • • Ingersoll Milling Machine Co. will build an 8500 sq. ft. addition of one-story construction, officials have announced.

Bethlehem Opens Buffalo Bar Mill

Buffalo

• • • Bethlehem Steel Co. opened its new \$4,000,000 bar mill in the town of Hamburg last Thursday. The new plant has the most modern hot bed in the world—275 ft. long. The new mill will roll bars from $\frac{7}{8}$ to $2\frac{1}{2}$ in. in diameter or square bars up to 2 in. The mill replaces the old No. 6 12-in. mill on the company's property across the street in Lackawanna, N. Y.

Board to Appraise Requisitioned Supplies

Washington

• • • Acting under the Faddis-Hill law of Oct. 10, which authorized the United States Government to requisition defense supplies that had been ordered for exportation, Col. Russell L. Maxwell, administrator of export control, last Saturday announced the establishment of a board of three Army officers to consider remuneration to be paid foreign owners of the supplies requisitioned. The chief purpose of the law was to permit the government to take over foreign-owned machine tools, which because of restrictions against their shipment abroad, were held at docks or remained in the hands of American manufacturers. The quantity of machine tools and other supplies requisitioned and to be requisitioned has not been revealed, but is known to be large. Other supplies include 110 warplanes which had been built in the U. S. for Sweden. At a hearing on the requisitioning bill, Col. H. R. Rutherford, director of plans, in the Office of the Assistant Secretary of War, said that there were a few shipments of alloy steel that probably would come under the measure.

The Compensation Board will hear all evidence relating to the financial aspects of each requisitioning case and make recommendations to the Administrator of Export Control regarding the proper amount due the owners of the requisitioned supplies. Members of the boards are:

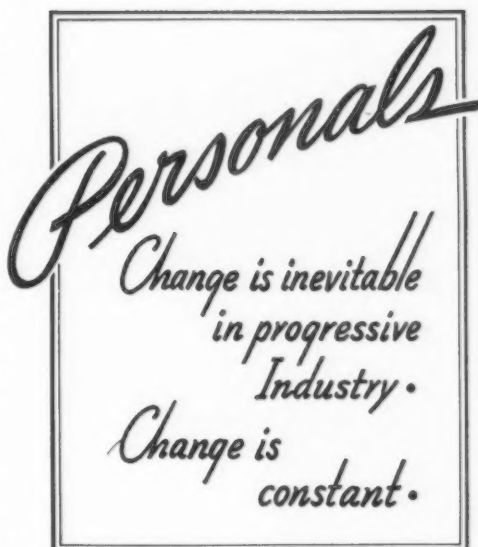
Brig. Gen. Edwin D. Bricker, retired, chairman; Col. Henry W. T. Elgin, retired, and Lieut. Col. Charles N. Trammell, reserve officer. Col. Francis R. Kerr, reserve officer, was named secretary of the board.

The Faddis-Hill Act provides that the owner of requisitioned supplies shall be paid "such sum as the President shall determine to be fair and just." In the event the owner is unwilling to accept the sum determined upon by the President (upon recommendation of the board) one-half of the amount will be paid and the owner entitled to sue for the additional sum.

• **Dr. W. D. Coolidge**, director of the research laboratory of General Electric Co., Schenectady, and **Stuart M. Crocker**, manager of the refrigeration and air conditioning department at Bloomfield, N. J., have been elected vice-presidents. Dr. Coolidge has been on the research laboratory staff since 1905.

• **C. M. Sayre**, for over 18 years engaged in production work for the Westinghouse Electric & Mfg. Co., has been made production manager of the Enterprise Foundry Co., San Francisco.

• **Peter Altman**, professor of aeronautics and head of the aeronautical engineering department at the University of Detroit for 15 years, has resigned to become associated with Aviation Mfg. Corp., research and development division. His office will be in Detroit at 459 York Street. A graduate of the University of Detroit in 1925, he has been a member of the faculty ever since. He was appointed assistant professor in 1927 and full professor a year later. Dr. Altman in the past has been consultant for a number of industrial concerns including Stinson Aircraft Co., which now is a division of Vultee Aircraft Inc. He is succeeded at the University by Prof. George J. Higgins, formerly his assistant. Aviation Mfg. Corp., Williamsport, Pa., is a whol-



ly-owned subsidiary of the Aviation Corp.

• **J. A. Ingwersen** has been named manager of the sheet and strip sales division of American Rolling Mill Co., Middletown, Ohio, and **F. E. Wortley** has been promoted to the position of manager of Midwestern sales, succeeding Mr. Ingwersen. Both men have had wide experience in sales work. Mr. Ingwersen has been connected with Armco's sales division for 15 years and Mr. Wortley's sales connection dates to 1912.

• **Leonid A. Umansky** has been appointed assistant manager of

the industrial engineering department of the General Electric Co., Schenectady. **Francis Mohler** has been made engineer of the steel mill section, succeeding Mr. Umansky. The latter was graduated from the Polytechnic Institute of Petrograd in 1915 and joined the Schenectady works of GE in 1919. Mr. Mohler joined the company in 1926 after his graduation from Virginia Polytechnic Institute and has been with the steel mill section of the industrial engineering department since 1929.

• **P. W. Brown**, since 1930 general superintendent in charge of production and experimental development, Wright Aeronautical Corp., Paterson, N. J., has been advanced to the position of assistant works manager. For nine years, Mr. Brown had been general superintendent of the Curtiss Aeroplane & Engine Co., Buffalo, and had occupied a similar position with the Eberhardt Steel Products Co., aircraft engine parts maker, also of Buffalo. Mr. Brown started his career in the automotive industry in Detroit in 1912, working in several automobile plants and tool and die shops there until called to Curtiss in 1916 to supervise the building of experimental aircraft models.

• **E. J. Hunt**, formerly general staff master mechanic of Chrysler



PETER ALTMAN, now associated with research and development division of Aviation Mfg. Corp.



J. A. INGWERSEN, manager of the sheet and strip sales division of American Rolling Mill Co.



F. E. WORTLEY, manager of Midwestern sales for Armco.

Corp., has been officially named operating manager in charge of Chrysler Tank Arsenal, as was reported in *THE IRON AGE* of Aug. 29, 1940, when the Chrysler tank "corps" was in its earlier days. Mr. Hunt is in charge of building, equipping and directing this operation. He has been associated with Maxwell and Chrysler corporations since 1912 and has worked in practically every machine and production department in both corporations. For the past two years he has been on the staff of Herman L. Weckler, vice-president and general manager. During that period he has served as one of the chief consultants on machinery and production methods. Born in 1892, Mr. Hunt went to school in Pinconning, Mich., after which he spent several years in small machine shops. In 1911 he joined the E. M. F. Co. The next year he became foreman of the crankshaft department at Maxwell. From 1912 to 1919 he was with Maxwell in Detroit and Dayton and then was made supervisor of the time study department in Highland Park. In 1920 he was made director of the tool engineering department. In 1923 he was put in charge of tooling the old Chalmers plant for the first Chrysler car. From 1925 to 1927 he was assistant master mechanic at the Highland Park plant, becoming master mechanic in 1927. A year later he was made

master mechanic of the new Plymouth plant and remained in charge of tools and machinery and mechanical operation of that plant until 1936 when the corporation placed him in charge of the central estimating department.

- **A. C. Brown**, first vice-president, Cleveland-Cliffs Iron Co., Cleveland, hitherto in charge of operations, will assume general oversight of sales of both iron ore and coal and also services rendered to others by the company. His new duties will not alter the status of **H. A. Raymond** and **A. D. Carlton** as managers of iron ore and coal sales respectively.

Max H. Barber, formerly Mesabi range district superintendent, who was recently elected a vice-president, will fill, on Jan. 1, the vacancy created by Mr. Brown's transfer. The position was offered to **S. R. Elliott**, manager of the mine department, but he preferred to remain in his present position at Ishpeming, Mich.

Walter A. Sterling has been made district superintendent to succeed Mr. Barber. **Henry C. Bolthouse** becomes superintendent of the Holman-Cliffs in addition to the Hill-Trumbull mine. **George E. Tucker** will become acting superintendent of the Canisteo mine.

- **Donald R. G. Cowan** has resigned as chief statistician of the

commercial research department of Swift & Co. to take the position of manager of commercial research of Republic Steel Corp., Cleveland. He received his master's degree from the University of Toronto in 1918 and for a time was a teacher of economics, marketing and allied subjects in Midwestern colleges.

- **Jackson H. Beyer** has joined the technical staff of Battelle Memorial Institute, Columbus, Ohio. He will be associated with the non-ferrous metallurgy division of the institute. Mr. Beyer is a graduate of the University of Wisconsin in metallurgical engineering.

- **Alfred Kauffmann**, president of the Link-Belt Co., celebrated his 40th year with the concern by meeting informally with officials, department heads, office and shop workers of both Pershing Road plant and the Caldwell-Moore stoker manufacturing works at the former plant. Mr. Kauffmann started with Link-Belt in 1901 as an engineer and has been president since 1924.

- **C. E. Harrison**, vice-president of the American Engineering Co., Philadelphia, has been appointed general manager. He will have general supervision of the entire activities of the company in addition to his duties as vice-president.



E. J. HUNT, operating manager in charge of Chrysler Tank Arsenal.



DONALD R. G. COWAN, manager of commercial research for Republic Steel Corp.



C. E. HARRISON, vice-president and general manager of American Engineering Co.

• **J. M. Corcoran**, formerly associated with the New York office of Tubular Service Corp., Brooklyn, has been transferred to Cincinnati to take charge of the company's newly opened branch office and warehouse at 2117 Reading Road. **J. M. Byers**, who has been in charge of sales in that district, will continue in that capacity.

• **Gordon H. Chambers**, vice-president of Foote Mineral Co., Philadelphia, has returned from an extended vacation trip to South America.

• **Dr. Edward Barstow**, who has been granted a year's leave of absence from the chemistry and chemical engineering department of Iowa University, has joined the research laboratories of Johns-Manville Corp., Manville, N. J., as chemical consultant.

• **Bruce P. Hetler**, formerly general sales manager of the Blackmer Pump Co., Grand Rapids, Mich., has been made manager in charge of engineering sales. **J. B. Trotman**, heretofore manager of the turbine pump division of the Roots-Connersville Blower Corp., has been made general sales manager in charge of sales distribution and advertising.

• **J. A. Gitzen**, president of the Delta Oil Products Co., Milwaukee, is to discuss "Characteristics and Uses of Core Binders and Washes" at the regular monthly meeting of the Detroit chapter of the American Foundrymen's Association at the Detroit Leland Hotel on Nov. 14.

• **P. J. Darling** has been appointed general sales manager of the Steel Sales Corp., Chicago. He has been with the firm's sales force for 11 years.

• **Frank E. Flynn**, Warren-Niles district manager of Republic Steel Corp., is the new president of the Trumbull Manufacturers Association. **John Wilder**, president, Wilder Mfg. Co., Niles, is vice-president, and **Ralph Kroehle**, president, Peerless Electric Co., Warren, is treasurer.

• **Irving S. Olds**, chairman of the board, United States Steel Corp., will be the principal speaker at the 47th annual banquet of the Illinois Manufacturers' Association, to be held Dec. 3 at Stevens Hotel, Chicago. The subject has not yet been announced.

Obituary

• **T. F. Howarth**, vice-president of the Simonds Saw & Steel Co., Fitchburg, Mass., died at his home in that city on Nov. 2, aged 77 years. He had been identified with the company for his entire business life, having joined the company in 1880. Seven years later he was transferred to the company's San Francisco office, where he remained for 10 years before returning to Fitchburg.

• **Charles L. Cameron**, sales engineer in the Newark, N. J., office of the Monarch Machine Tool Co., Sidney, Ohio, died of a heart attack on Nov. 1. He had been identified with the Monarch organization since 1927.

• **John Francis Strong**, at one time employment or personnel man for the Studebaker Corp., Great Lakes Engineering Works, Briggs Mfg. Co. and Chrysler Corp., died in Detroit recently. For the last 12 years he had been associated with the State Board of Control for Vocational Education, Rehabilitation Division. Born in Marshall, Mich., 56 years ago, he had lived in Detroit 30 years.

• **Thomas Julian Skinner, Sr.**, superintendent of rehabilitation of company houses, Tennessee Coal, Iron & Railroad Co., Birmingham, died Nov. 7, aged 55 years.

• **John G. Thompson**, educator, author and industrial economist, died in Fitchburg, Mass., Oct. 31. He became associated with the Simonds Saw & Steel Co. in 1900 as an assistant to Alvin T. Simonds, president, and was largely responsible for the many business forecasts issued by the company. He was born in New Bedford, Mass., 78 years ago.

• **Archie W. Lucas**, for the past 11 years New England sales manager for the Jessop Steel Co., Washington, Pa., died at the New Haven Hospital recently as a result of a heart condition. Mr. Lucas was for many years the foreman of the silverware die cutting department for R. Wallace & Sons Co., Wallingford, Conn. In 1919 he joined the sales force of the Crucible

Steel Co. of America and 10 years later became district manager of the Jessop Steel Co., Hartford.

• **Carl A. Edlund**, president-treasurer of Edlund Machinery Co., Inc., Cortland, N. Y., died recently. Mr. Edlund had been president-treasurer of the company since the death of his father in 1931.

• **James Alexander Smith**, statistician for the United States Steel Corp. and formerly sales manager for the American Sheet & Tin Plate Co., died at his home in Detroit, Nov. 13, aged 63 years. He had been a resident of Detroit for 35 years.

• **Henri de Boischevalier**, who retired in 1938 after 24 years as chief engineer of Zenith Carburetor Co., Detroit, died recently. Born in Germany 67 years ago and educated in universities there as well as at the University of Paris, he went to Detroit in 1910 and joined Zenith. During the World War he was employed in the Aircraft Industrial Service.

• **Charles A. Bartlett**, retired treasurer of Graton & Knight Co., Worcester, Mass., died recently. He was born in Rutland, Mass., 76 years ago. Mr. Bartlett retired from Graton & Knight in 1938 after more than 46 years of service.

• **Louis E. Zurbach**, president and treasurer of the L. E. Zurbach Steel Co., Somerville, Mass., which he organized in 1926, died suddenly on Nov. 7. Mr. Zurbach first became associated with the steel industry as salesman and then purchasing agent for the Wetherell Brothers Steel Co., Cambridge, Mass.

• **Ernest B. Whitmarsh**, factory superintendent, Detroit Brass & Malleable Co., died recently in Detroit. Mr. Whitmarsh was born in Vanderbilt, Mich., 59 years ago.

• **Verne E. Sorge**, president of the Pyramid Stamp & Tool Co., Detroit, died Nov. 11, aged 56 years. He was connected with the foreign sales department of Hudson Motor Car Co. when he first went to Detroit 30 years ago. Later he was in the real estate business and, following the World War, he founded the Pyramid company. During the war he was in charge of liaison intelligence work for the 2nd Battalion of the 42nd Division.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Nov. 19, 1940	Nov. 12, 1940	Oct. 15, 1940	Nov. 21, 1939
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.00
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.00
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	1.92
Skelp (grv'd.)	1.90	1.90	1.90	1.90

Pig Iron:

	Nov. 19, 1940	Nov. 12, 1940	Oct. 15, 1940	Nov. 21, 1939
(Per Gross Ton)				
No. 2 fdy., Philadelphia	\$24.84	\$24.84	\$24.84	\$24.84
No. 2, Valley furnace	23.00	23.00	23.00	23.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	23.06
No. 2, Birmingham	19.38	19.38	19.38	19.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	23.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	24.34
Basic, Valley furnace	22.50	22.50	22.50	22.50
Malleable, Chicago†	23.00	23.00	23.00	23.00
Malleable, Valley	23.00	23.00	23.00	23.00
L. S. charcoal, Chicago	30.34	30.34	30.34	30.34
Ferromanganese‡	120.00	120.00	120.00	100.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:

(Per Gross Ton)				
Heavy melt'g steel, P'gh.	\$21.75	\$21.50	\$21.50	\$20.75
Heavy melt'g steel, Phila.	20.75	20.75	20.75	20.75
Heavy melt'g steel, Ch'go	20.25	20.00	19.75	17.25
Carwheels, Chicago	21.00	20.25	20.25	16.50
Carwheels, Philadelphia	23.25	23.25	22.75	21.25
No. 1 cast, Pittsburgh	22.25	22.25	22.25	20.75
No. 1 cast, Philadelphia	22.75	22.75	22.75	22.25
No. 1 cast, Ch'go (net ton)	18.00	17.75	17.75	15.00

Coke, Connellsville:

(Per Net Ton at Oven)				
Furnace coke, prompt	\$5.25	\$5.25	\$4.75	\$5.00
Foundry coke, prompt	5.75	5.75	5.25	5.75

Non-Ferrous Metals:

(Cents Per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	12.50
Copper, Lake, New York	12.00	12.00	12.00	12.50
Tin (Straits), New York	50.375	50.75†	51.875	**52.00
Zinc, East St. Louis	7.25	7.25	7.25	6.50
Lead, St. Louis	5.65	5.65	5.10	5.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only. †Revised.
**Nominal.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 117-126 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

FINISHED STEEL				PIG IRON				SCRAP STEEL			
Nov. 19, 1940	2.261c. a Lb.			\$22.61 a Gross Ton				\$20.92 a Gross Ton			
One week ago	2.261c. a Lb.			\$22.61 a Gross Ton				\$20.75 a Gross Ton			
One month ago	2.261c. a Lb.			\$22.61 a Gross Ton				\$20.67 a Gross Ton			
One year ago	2.236c. a Lb.			\$22.61 a Gross Ton				\$19.58 a Gross Ton			
High				High				High			
1940	2.261c., Jan. 2	2.211c., Apr. 16		\$22.61, Sept. 19	\$20.61, Sept. 12			\$20.92, Nov. 19	\$16.04, Apr. 9		
1939	2.286c., Jan. 3	2.236c., May 16		23.25, June 21	19.61, July 6			22.50, Oct. 3	14.08, May 16		
1938	2.512c., May 17	2.211c., Oct. 18		23.25, Mar. 9	20.25, Feb. 16			15.00, Nov. 22	11.00, June 7		
1937	2.512c., Mar. 9	2.249c., Jan. 4		19.73, Nov. 24	18.73, Aug. 11			21.92, Mar. 30	12.92, Nov. 10		
1936	2.249c., Dec. 28	2.016c., Mar. 10		18.84, Nov. 5	17.83, May 14			17.75, Dec. 21	12.67, June 9		
1935	2.062c., Oct. 1	2.056c., Jan. 8		17.90, May 1	16.90, Jan. 27			13.42, Dec. 10	10.33, Apr. 29		
1934	2.118c., Apr. 24	1.945c., Jan. 2		16.90, Dec. 5	13.56, Jan. 3			13.00, Mar. 13	9.50, Sept. 25		
1933	1.953c., Oct. 3	1.792c., May 2		14.81, Jan. 5	13.56, Dec. 6			12.25, Aug. 8	6.75, Jan. 3		
1932	1.915c., Sept. 6	1.870c., Mar. 15		15.90, Jan. 6	14.79, Dec. 15			8.50, Jan. 12	6.43, July 5		
1931	1.981c., Jan. 13	1.883c., Dec. 29		18.21, Jan. 7	15.90, Dec. 16			11.33, Jan. 6	8.50, Dec. 29		
1930	2.192c., Jan. 7	1.962c., Dec. 9		18.71, May 14	18.21, Dec. 17			15.00, Feb. 18	11.25, Dec. 9		
1929	2.236c., May 28	2.192c., Oct. 29		Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.				Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.			

Summary of the Week

WITH steel ingot production at a new peak of 97 per cent of the industry's capacity, new business is flowing to the mills at a rate considerably in excess of shipments and compares closely in total volume with that of the hectic buying period in October, 1939. In the first half of November one of the large steel companies booked more business than in any like period in its history.

Sale of steel being no problem, steel companies are concentrating their attention on production and distribution. The problems of distribution are becoming more acute as deliveries lengthen, placing many steel users in a position where they must wait for many weeks unless they can obtain government certification of immediate need for defense manufacturing.

Although the Priorities Board of the National Defense Advisory Commission is now functioning, a voluntary system of priorities still prevails in the steel industry. Steel users may obtain a request for preference upon application to the government department for which they are doing work or from the Priorities Board, but orders sent in with merely the unsupported statement that they are for defense work are receiving no attention other than that paid to ordinary commercial orders.

DEFENSE work is forming an ever-increasing proportion of total steel business, but on top of all that is a tremendous demand from manufacturers who are to a large extent pursuing their normal lines of activity, but at an increased pace. The automobile industry, the railroads, refrigerator manufacturers and many other makers of household equipment are among those whose needs have increased.

Total sales are in such volume that steel mills will be booked through the first quarter on most products within 30 days or less and some orders are now being received, unsolicited, for second quarter. These are being accepted on the basis of price in effect at time of shipment.

With only a few exceptions, steel products are now quoted for January delivery at the earliest. In some instances—plates, for example—February shipment is commonly the best that can be offered. The British, whose purchases have been stepped up to at least 400,000 tons a month, are finding it difficult to obtain desired deliveries on some items. In addition to large steel purchases, the British have contracted for about 200,000 tons of pig iron for shipment next year.

WHETHER the steel industry will be able to meet all of the demands of the defense program and at the same time provide steel for full normal activities is still a moot question. One view which is commonly held in Washington official circles is that there

Steel ingot production, rising to new peak of 97 per cent, is not keeping pace with volume of new business, which is at record heights . . . First quarter output may soon be sold . . . Sales being made into second quarter . . . Scrap prices higher.

is not enough capacity, while the steel industry continues to maintain that capacity will be sufficient if orderly conditions prevail. Moreover, it is pointed out that new steel capacity of importance cannot be completed soon enough to be of much help in the defense program. As an example, the 400,000-ton a year addition to steel making facilities announced by the Tennessee Coal, Iron & Railroad Co. will not be completed for 18 months, by which time the peak of defense requirements may have passed unless the United States becomes engaged in war.

Results of the heavy pressure on the steel industry are to be seen in increasing apprehension over coke supply, with all available facilities being prepared for use, and in advancing prices of scrap despite the efforts of the National Defense Advisory Commission to hold them in check. There are mixed trends in scrap markets, but price changes are generally upward. No. 1 steel is up \$1 at Buffalo and there have been minor advances at Pittsburgh and Chicago, bringing THE IRON AGE composite price to \$20.92, or 17c. over last week. Cast scrap is especially strong owing to pig iron shortage.

IRON ore supply will undoubtedly be ample to carry through the winter. The season's movement to Nov. 10 was about 61,000,000 tons and Lake vessels will be operated later than usual this year, indicating a carryover at close of navigation of 40,000,000 tons or more.

Railroad purchases of rails are increasing. In addition to the Pennsylvania order for 75,000 tons and that of the Rock Island for 35,000 tons, nearly 60,000 tons is pending. Fabricated structural steel awards of 22,725 tons were largely for defense work, as are inquiries totaling nearly 42,000 tons.

Although steel prices are not expected to change for first quarter, rail steel bars, both merchant and reinforcing grades, have gone up \$2 a ton in some districts, a reflection of higher cost of scrap rails.

The Industrial Pace . . .

A FURTHER MODERATE RISE in the durable goods industries during the past week was indicated by THE IRON AGE index of capital goods activity, which rose 4.6 points to 122.8, as compared with 118.2 in the previous week. Principal factors affecting the advance were expanded operations in the automobile and heavy construction industries, as well as the maintenance of activity in other industries at levels higher than seasonally normal.

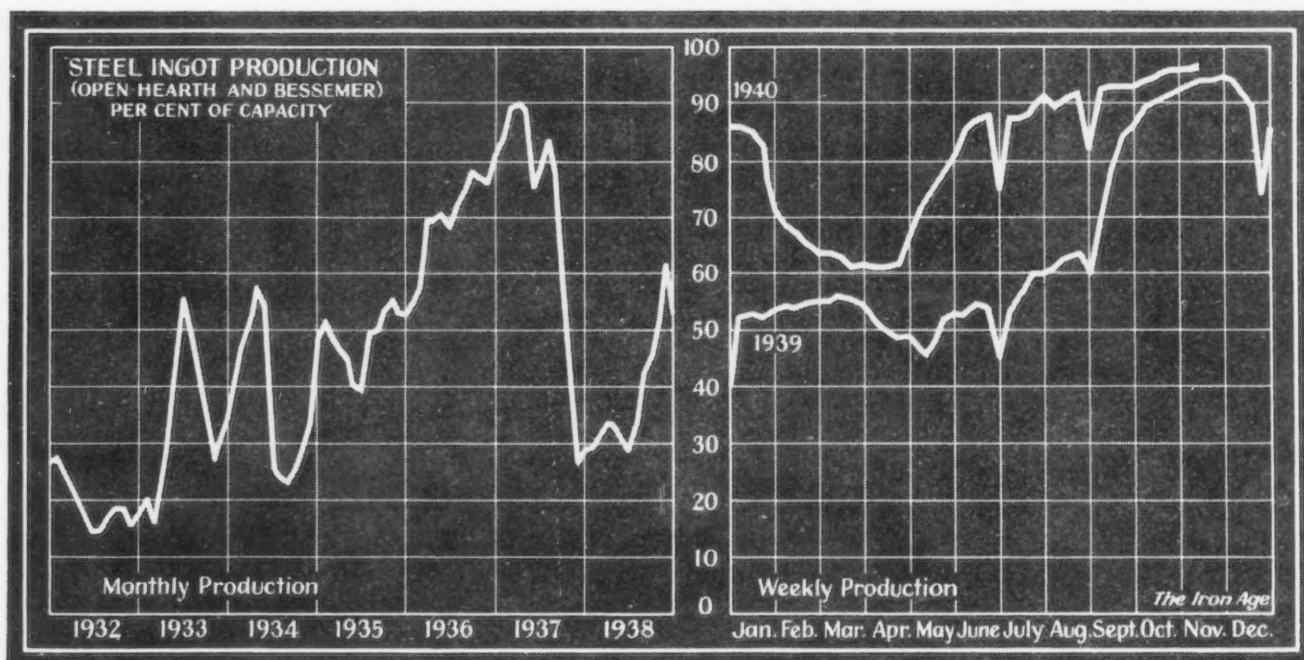
Automobile output has been stepped-up steadily for 14 weeks and is expected to reach its peak soon. Present indications are that production will hold on a high plateau for a longer period than usual and that the decline this year will be more gradual. The automobile index for the past week was 126.6, comparing with 121.1 in the preceding week, and 109.0 a month ago. Physical output was 121,943 units as against 120,948 in the week ended Nov. 9.

Sharpest rise occurred in the heavy engineering construction index, which rose 12.1 points to 147.8 from 135.7 in the preceding period. Contracts awarded exceeded \$100,000,000 for the fourth time in the last five weeks, standing at \$139,119,000, as compared with \$79,645,000 in the previous week. Privately financed construction rose to \$32,609,000 from \$22,645,000 in the previous period, while public contracts were up from \$57,000,000 to \$106,000,000. Among the larger awards were \$37,500,000 for an ammunition loading plant in Indiana and \$34,451,384 for a shell loading plant in Iowa.

SHIPMENTS of the U. S. Steel Corp. in October (see graph) were the second highest in the history of the corporation, having been only 7.6 per cent below May, 1929, when an all-time record total of 1,701,874 tons was shipped. October deliveries, equaling 95.8 per cent of finishing capacity, totaled 1,572,408 net tons, 13 per cent higher than September when deliveries equaling 87.8 per cent of capacity totaled 1,392,838 tons, and 17 per cent higher than October, 1939, when 1,345,855 tons, equaling 79.9 per cent of capacity, was shipped. Deliveries for the first 10 months of 1940 totaled 12,006,135 net tons, compared with 8,901,942 tons in the corresponding period for 1939, an increase of 3,104,193 tons, or about 35 per cent.

After holding at \$20.67 for four weeks, the composite price of iron and steel scrap (see graph) rose 8c. last week to \$20.75. A strong demand for scrap resulting from heavy steel mill operations has been modified by the government's attitude of discouraging sharply rising prices. In 1939, from the week ended July 3 to the week ended Oct. 3, 13 weeks in all, the scrap composite rose \$7.79 to a high of \$22.50. During the 13-week period from the week ended Aug. 6 to the week ended Nov. 11 in 1940 the composite rose only \$2.58 to \$20.75. So far in 1940 the composite has ranged from a low of \$16.04 in the week ended April 9 to a high of \$20.75, as compared with a range of \$14.08 to \$22.50 in 1939.

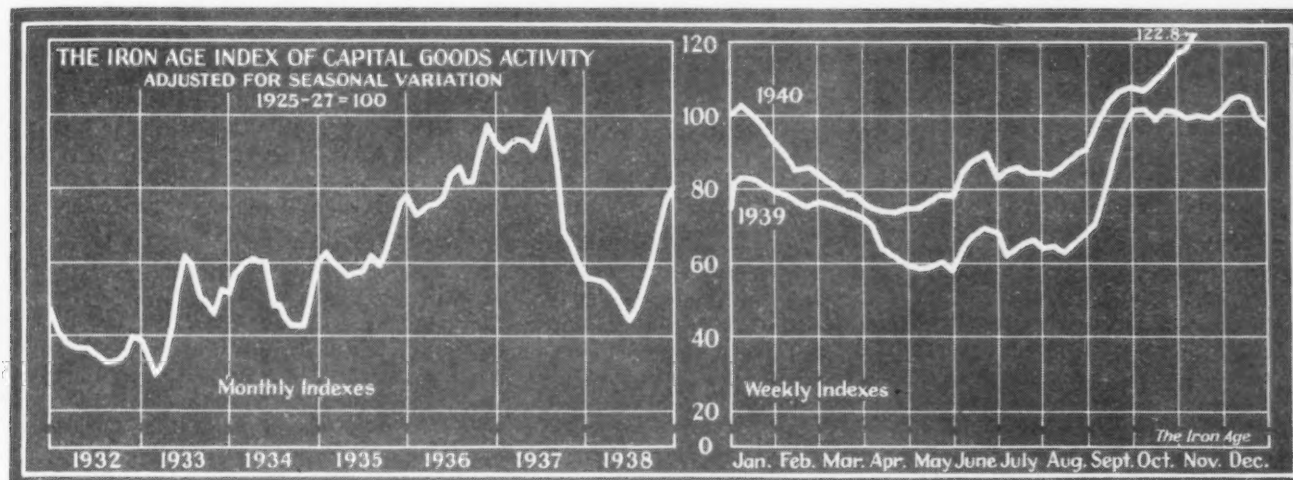
Ingot Operations at 97.0% Reach New Peak



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week	96.0	100.0	97.0	94.0	93.0	106.0	104.0	100.0	106.0	107.0	76.0	100.0	83.0	97.0
Previous Week	93.0*	99.0	96.0	94.0	89.0	104.5	104.0	89.5	109.0	104.0	76.0	100.0	75.0	96.0

* Revised.

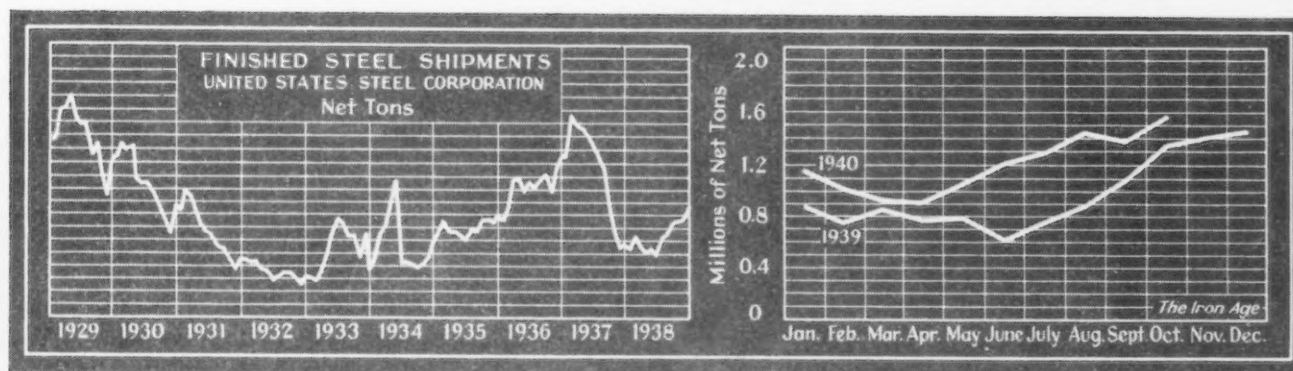
Capital Goods Index Gains for Fifth Successive Week



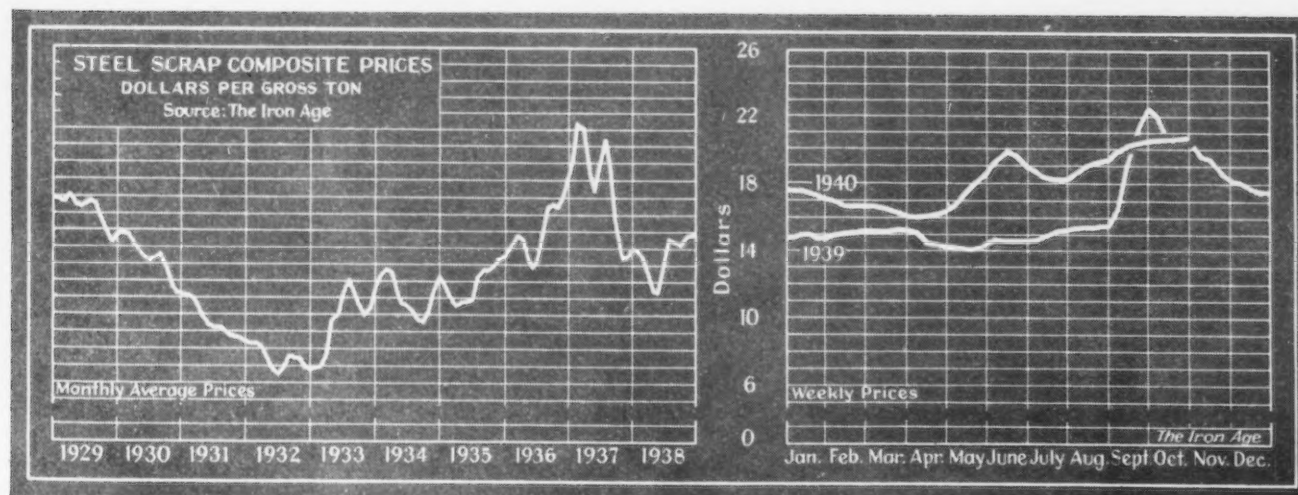
Component	Week Ended	Nov. 16	Nov. 9	Oct. 19	Nov. 18 1939	Nov. 16 1929
Steel ingot production ¹		143.0	140.5	135.9	138.5	104.6
Automobile production ²		126.6	121.1	109.0	89.6	102.2
Construction contracts ³		147.8	135.7	120.2	81.3	115.5
Forest products carloadings ⁴		78.4	77.1	74.5	72.5	106.9
Pittsburgh output and shipments ⁵		118.3	116.5	109.6	117.5	108.0
COMBINED INDEX		122.8	118.2	109.8	99.9	107.4

Sources: ¹ THE IRON AGE; ² Wards Automotive Reports; ³ Engineering News-Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended Nov. 9. Other indexes cover week of Nov. 16.

U. S. Steel October Shipments Second Highest on Record



Scrap Composite Levels Off at \$1.75 Below 1939 Peak



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

... Volume of orders up substantially over October

The flow of steel orders to PITTSBURGH mills has not only continued unabated in the past week but the volume booked was slightly ahead of the previous week's experience. Even if export tonnage were removed from total sales the amount of domestic tonnage would still run well above either shipments or production. Virtually no room is left on fourth quarter schedules and most products being booked now are for delivery either in January or later.

Orders so far this month at PITTSBURGH continue to run from 25 to 35 per cent in excess of the volume booked in the same period last month. British purchases are running at a rate approximating 400,000 tons a month and it is believed this will continue for at least another month. Bars, structural plates and shapes, and sheets head the list of products in greatest demand.

Order backlogs held by steel producers at CLEVELAND and YOUNGSTOWN continue to rise. Practically all new business now being scheduled is for first quarter shipment and some consumers in order to get their requirements on the books have specified for delivery up to July of next year. Producers are not guaranteeing either delivery or price on such extended business.

Great Britain is believed to have negotiated heavy steel and iron requirements recently, including around 200,000 tons of pig iron for delivery next year. In the domestic market, iron has been sold on the basis of the consumer absorbing freight from the furnace, a development which has also made its appearance in steel markets here and there.

Forging plants in northern Ohio have been ordering for government contracts involving gun parts. Contracts for the construction steel for the Ravenna, Ohio, shell loading plant are nearing the award stage, with bids being taken now on about

11,500 tons of fabricated steel, in addition to the award of 5000 tons of reinforcing bars to Paterson-Leitch Co., Cleveland, which was noted last week.

Coke shipments continue to rise, indicating that foundries are increasing their production steadily. Scrap markets hold every evidence of becoming tighter as winter sets in. The iron ore movement was delayed three days by the severe storm on the Great Lakes and vessels now are being put into winter quarters.

Besides direct government awards, much new tonnage has been placed with steel companies to fill negotiated contracts for the government. The extent of this buying is impossible to gage. But the opinion still is prevalent at CLEVELAND that the peak of the defense program buying is still some months ahead.

Though orders at CHICAGO for the past week were on a par with those of the preceding week, new business for the first half of November is slightly off compared with the same period in October. Mills there do not show surprise at this. Buying remains orderly and consumers are cooperating with mills, all of which have mounting backlogs and are extending deliveries along the line. Structural business is exceptionally active in that area with numerous government and private undertakings, such as the powder plant at Wilmington, Ill., and others throughout the Mid-west promising sizable tonnage. In some quarters, structural business overflowing from the East is expected to also go to CHICAGO mills. Although bars, both carbon and alloy, still reign as the most active products in that district, structural business is pushing for the top spot.

Defense orders are coming in at a heavier pace each week. Coupled with a heavy general demand from what is termed non-defense sources, all mills in the CHICAGO area are sold out for the remainder of this year, and first quarter bookings are increasingly common. One steel-maker now promises certain sizes of shapes for the second quarter

of 1941. Heavy machinery manufacturers, agricultural implement builders, forgers, tank contractors, building construction, railroads and defense are the most active buying factors.

Bookings have reached such proportions in the BIRMINGHAM district that the Tennessee Coal, Iron & Railroad Co. is reported to be requisitioning semi-finished steel and pig iron from Carnegie-Illinois Steel Corp. For the district generally, indications point to peak operations during the first quarter of 1941.

New orders are being taken at a rate well in excess of October volume at all mills in the eastern Pennsylvania district. Demand for structural materials, plates, and bars hold at high levels. Flat rolled bookings are now reaching similar volume.

Prices

... Rail steel raised to billet steel level at Chicago

Inland Steel Co. and Calumet Steel Co., Chicago, have raised prices on rail merchant bars to 2.15c. Inland also raised rail reinforcing bars to 2.15c. Calumet also raised axle merchant bars to 2.15c.

Although rail steel merchant bars are now definitely priced on a parity with new billet merchant bars, or equivalent to 2.15c. a lb. f.o.b., Pittsburgh, rail steel reinforcing bars cannot be said to have reached a price parity with the published quotations on new billet steel reinforcing bars. One Pittsburgh district maker of rail steel reinforcing bars has advanced his price to the same level as new billet, but this action has by no means as yet become general, although the situation may clarify itself soon. In some cases rail steel reinforcing bar makers are realizing prices higher than the published price of 2.05c. a lb. f.o.b. Pittsburgh.

Crucible Steel Co. of America on Monday reaffirmed present tool steel prices for such first quarter business as can be shipped in that period for consumers' "normal needs."

Pig Iron

... Activity increasing and metal is harder to obtain

With the defense program beginning to trickle down to the foundry field, melters are stepping up their activity sharply. This is reflected in foundry coke shipments at CLEVELAND, which up to Nov. 18 were considerably ahead of the comparable October period. All foundries continue attempting to build up their stocks of pig iron. November shipments of one CLEVELAND seller are running ahead of the October volume, but in the case of another important seller they are off from October because producers' stocks of certain special grades are exhausted. As demand continues high, it may be expected that more standardization of consumer requirements will result. Ford Motor Co. is understood to have been in the market generously recently.

Pig iron supplies at PITTSBURGH continue to be relatively tight, although regular customers are still being adequately serviced. There has been no indication as to what the price will be for the first quarter and it is not expected that any announcement will be made in the immediate future.

With major producers of merchant iron in the PHILADELPHIA district all but sold out, supplies are becoming increasingly difficult to procure. Buyers in the market for sizable tonnages of even common grades, without regular sources of supply, find iron almost impossible to obtain. Deliveries so far in November are ranging up to 20 per cent over October.

Pig iron production is back to capacity at Birmingham with Sloss Sheffield completing repairs on furnace No. 3. Increasingly heavy demand is attributed in part to cast iron pipe purchases for government cantonment projects in the South.

Shipments to melters in the St. Louis area in the first half of November were well ahead of the corresponding period in October, which was the best October since 1937.

The second stack of the Hamilton Coke & Iron unit of the American Rolling Mill will go into blast this week.

Iron Ore

... Lake Superior movement to Nov. 10 about 61,000,000 tons

During October consumption by blast furnaces depending principally upon Lake Superior iron ore was highest of any month since May, 1923. The latest figure, issued by the Lake Superior Iron Ore Association, Cleveland, sets consumption at 6,051,347 gross tons, compared with 5,671,918 tons in September. Ore on hand at Lake Erie docks and furnaces Nov. 1 totaled 41,125,450 gross tons contrasted with 37,090,053 tons on Oct. 1 and 39,004,657 tons Nov. 1, 1939. The latest report shows 163 furnaces using Lake ore operating Oct. 31 out of 189, a gain of four during October.

Meanwhile the vessel movement of Lake Superior iron ore is waning. Following the gale which disrupted the movement for three days starting Nov. 11, shipping companies began to order their craft into winter quarters. The last ore shipment of Pittsburgh Steamship Co., largest Lake operator, is expected to come to the lower Lakes at the end of this week or early next week, a later season for the company than usual. Eleven vessels comprising the Interstate and Midland fleets went into winter quarters last week, with a number of barges. Those companies which have obligations to fill will continue to Nov. 30, when insurance expires. Some may run in December by paying special insurance premiums.

Through Nov. 10 shipments had been excellent and the season total was near 61,000,000 gross tons, the result of urgent activity which saw an all-time record set for the month of October.

The 7200-ton freighter *William B. Davock* of the Interlake Line sank with loss of life in Lake Michigan, where the storm was hardest. The 5900-ton carrier, *Sparta*, of the Tomlinson fleet had been lost a few days earlier. Damage to other vessels was heavy, principally from sprung plates.

Loading has been slowed at upper Lake docks since Nov. 10. With near-zero temperatures it is necessary to steam the ore and, only a few boats per day can be handled at each dock.

Coke

... Additional by-product and beehive ovens going in

The coke situation in Ohio and Indiana reflects the steadily increasing demand noticed in other areas. Currently, the coke producers are disposing of all output with a fear that a stricture on fuel may be the chief bottleneck in the steel business. An Indianapolis producer is putting in 41 new ovens and an Ashland producer is adding 75. Elsewhere in the district old beehive ovens are being pressed into service in an effort to get ample production to take care of needs. Prices continue steady.

Semi-Finished Steel

... Scarcely any material available before first quarter

With shipments as heavy as facilities will permit and with incoming specifications heavier than production, little or no fresh business can be booked for delivery this quarter at PITTSBURGH. All orders accepted now are taken on the basis of price at time of shipment. Sheet bar demand has stepped up sharply owing to the pick-up in flat rolled steel requirements and likewise skelp orders adequately reflect a sharp upsurge in demand for merchant pipe which materialized recently owing to national defense support. Some mills are turning down business owing to their own need for all raw steel.

Recent sales in the CLEVELAND and YOUNGSTOWN territories have included half a dozen orders for forging steel for gun parts, while a central Ohio forging company has awarded considerable tonnage in connection with its Government contract for howitzers.

Structural Steel

... New projects, mostly defense work, total 42,000 tons

Fabricated structural steel awards at 22,725 tons are slightly lower than last week. Sizable lettings are 5000 tons for the munitions plant at Wilmington, Ill., for E. I. du Pont de Nemours & Co.; 3000 tons at Seattle, Wash., for the Boeing Aircraft plant extension; 2500 tons of H piling for a Navy

project at Orchard Point, Wash.; 1500 tons for a War Department supply building at Duncan Field, San Antonio, Tex.; 1200 tons for the Cincinnati Milling Machine Co. expansion at Cincinnati, and 1000 tons for the Spokane River bridge at Lincoln, Wash.

New structural steel projects advanced to 41,910 tons from 37,925 tons a week ago. Outstanding in-

quiries include 11,500 tons for a shell loading plant at Ravenna, Ohio, on which bids are being taken; 8000 tons for transmission towers between Grand Coulee Dam and Covington, Wash.; 6000 tons for shipways for the New York Shipbuilding Corp.; 1300 tons for a warehouse for Sears, Roebuck & Co. at Cleveland; 1200 tons for a process plant for the Jefferson

Island Salt Mining Co., Jefferson Island, La.; 1000 tons at Dutch Flat, Cal., for a power house for the Pacific Gas & Electric Co., and 1000 tons for an airplane plant for the Goodyear Tire & Rubber Co., Akron, Ohio.

Reflecting the rapid tempo that has existed for several weeks, structural shape tonnage booked in Pittsburgh in the past week ran substantially ahead of a week ago and as a consequence backlogs were further increased. Mills continue to keep an eagle eye on all commitments so that the best service may be rendered to the greatest number.

Sheets and Strip

... January delivery now quoted in many instances

Refrigerator and stove makers, as well as a host of miscellaneous consumers, have been specifying heavily during the past few weeks, according to PITTSBURGH mills. Automotive buying included some rather large tonnages within the past week. Deliveries from PITTSBURGH mills are somewhat more extended than was the case a month ago and practically all tonnage going on the books today is slated for January delivery or later.

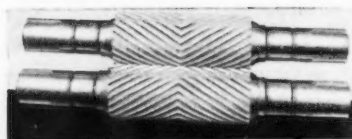
At CLEVELAND and YOUNGSTOWN hot rolled items are sold out for the remainder of this year. Delivery promises on enameling sheets extend far into January because of the high demand recently from manufacturers of household equipment items. Heavy orders have been received recently from drum makers for barrel stock for oil, gas and water containers needed in connection with the government program.

A slight dip in new business occurred at CHICAGO the past week, though fresh orders were more than satisfactory. Many new buyers are noticed in that market, due to the defense program. Strip 2½ in. and under is now quoted by one mill from three to four weeks delivery and sheets of strip mill sizes have been extended to two to three weeks. Both hot and cold rolled sheet deliveries have also been lengthened.

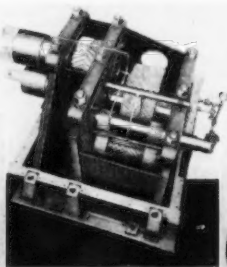
Demand for flat steel in SOUTHERN OHIO bounded upward suddenly during the past week to an average approaching 150 per cent of mill capacity. District mills have built up substantial backlogs.

FARREL GEAR DRIVES and PINION STANDS

Adaptable to Individual
Operating Conditions

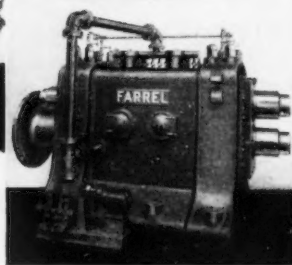


Below and Center—Two views of Double Reduction Drive and integral 20-inch Pinion Stand with welded steel case.



Above—Farrel-Sykes continuous tooth herringbone rolling mill pinions are precision generated for smooth, quiet operation.

Right—4,000 HP Pinion Stand for four-high reversing cold strip finishing mill.



Farrel Heavy Duty Rolling Mill Drives and Pinion Stands are adaptable by design and construction to individual conditions of operation. For example, the beds may be cast steel or Meehanite or welded steel construction. Dependent upon load conditions and the requirements for rigidity a double-walled or single-walled deep base may be used. Bearings may be either plain babbitt-lined steel cartridges or any approved make of anti-friction bearing.

While gears and pinions are usually continuous-tooth herringbone, accurately generated by the Farrel-Sykes

process, either single helical or a combination of single and double helical gears can be furnished. As conditions demand, lubrication may be by dip and splash system, by pump built into the unit and driven by one of the shafts, or by separate lubrication system.

The high precision with which Farrel Mill Drives and Pinion Stands are made assures smooth, quiet operation, and their rugged construction enables them to withstand the stresses, shocks and wear incident to the high speeds and heavy loads of modern mill practice.

When you have a gear problem call in a Farrel gear engineer for consultation.



Reinforcing Steel

... Two Chicago mills advance prices to parity with billet steel

Two mills in the CHICAGO district, Inland Steel Co. and Calumet Steel Co., have advanced prices of rail steel reinforcing bars, as well as rail steel (or axle steel) merchant bars to 2.15c. a lb., which puts them on a price parity with billet steel bars. Rail steel makers in the vicinity of Pittsburgh, however, have made no official move to advance their prices, though a small amount of business has been booked at quotations above the published prices.

Reinforcing steel awards of 11,860 tons include 1600 tons at Cheektowaga, N. Y., for the Curtiss-Wright Corp.; 1600 tons for seven additional hangars at Gravelly Airport, near Washington; 1000 tons for supply piers at the Norfolk Navy Yard, Va., and 1000 tons for the Boeing Aircraft plant addition at Seattle, Wash.

New reinforcing steel projects total 7050 tons. The largest inquiries are 1430 tons for the United States engineer at San Francisco and 1200 tons for a marine warehouse at Philadelphia.

Railroad Buying

... Orders placed for 110,000 tons of rails ... 58,500 tons pending

A spurt in rail buying featured the railroad market in the past week with 110,000 tons purchased and inquiries for about 58,500 tons issued.

The largest purchase was 75,000 tons by the Pennsylvania, allocated as follows: Carnegie-Illinois Steel Corp., 37,500 tons; Bethlehem Steel Co., 33,000 tons and Inland Steel Co., 4500 tons. Earlier this year the Pennsylvania placed 50,000 tons and deliveries are still being made on a 50,000-ton order placed in 1939.

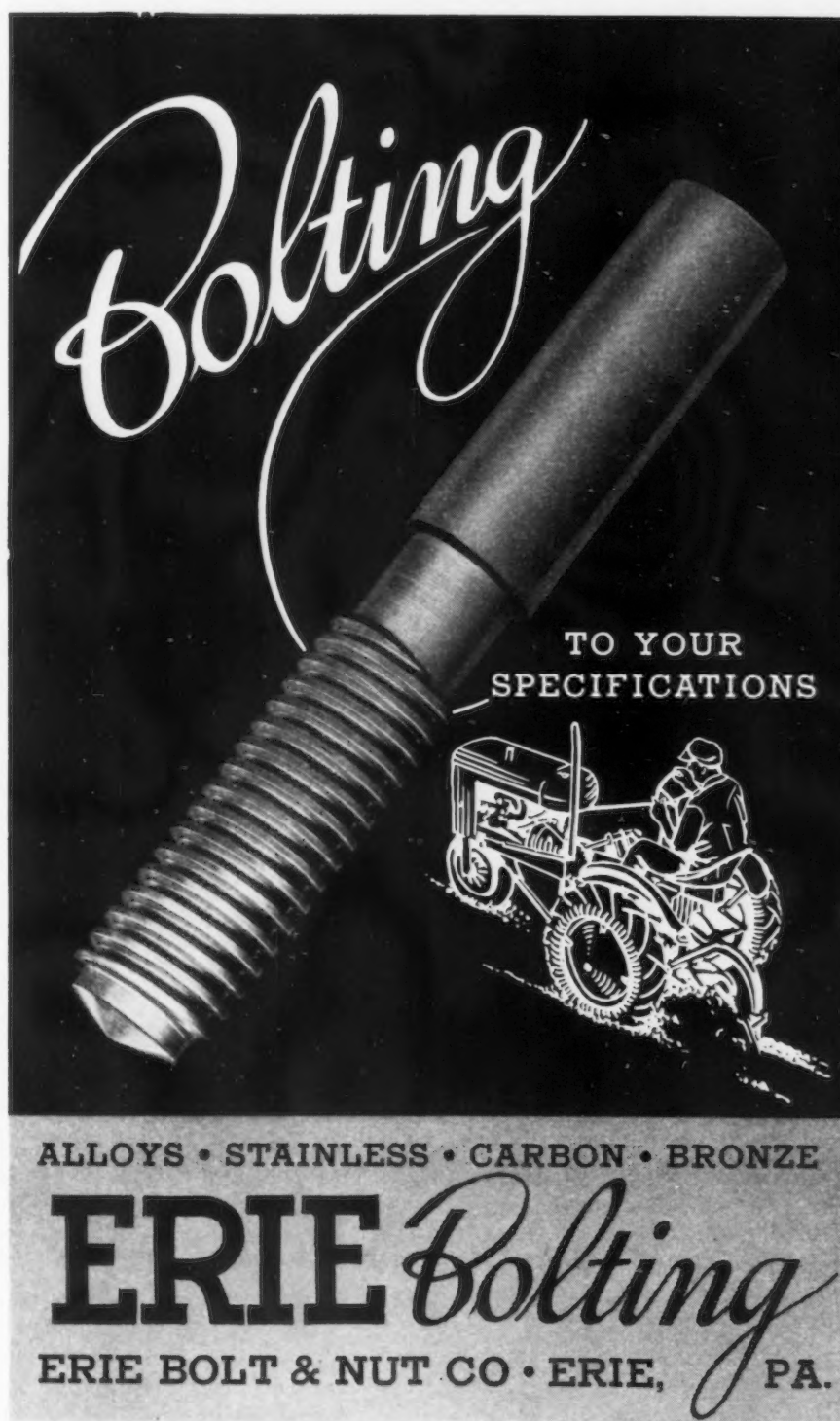
The only other rail purchase reported was 35,000 tons for Rock Island, with 21,900 tons of this total placed with Carnegie-Illinois Steel Corp., 10,000 with Inland Steel Co., and 3100 with Colorado Fuel & Iron

Corp. Southern Pacific has purchased a large quantity of track accessories in addition to the rails reported in THE IRON AGE, Nov. 7.

New rail inquiries include 30,000 tons for the Burlington, 3500 tons for Central of New Jersey, 15,000 tons for New York, New Haven & Hartford and 10,000 tons for Wabash. This latter road has also re-

ceived court authority to lay 45 miles of relaying rails.

Chief equipment purchase reported was 20 steam locomotives for Santa Fe, awarded to Baldwin Locomotive Works. Other equipment purchases were 20 box cars for the Government, awarded to General American Transportation Corp. U. S. Army has placed four cars and Navy Department has placed 14



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freight cars with Haffner-Thrall Car Co.

Pending equipment car purchases include 3150 cars for Louisville & Nashville, 1000 cars for Bessemer & Lake Erie, 25 passenger cars for New York Central and two diesel-electric switching locomotives for Seaboard Air Line.

The Bessemer & Lake Erie has asked ICC authority to issue \$4,000,000 in equipment trust certi-

ificates to purchase seven locomotives, 1200 all-steel freight cars and 20 all-steel cabooses to cost \$5,350,000. The American Car & Foundry Co. will build 100 50-ton lightweight design box cars.

The Lehigh & New England has asked authority to issue \$640,000 in equipment trust certificates to apply on the purchase of 300 all-steel hoppers to be built by The Pressed Steel Car Co.

Tubular Goods

... Pipe less active than other steel products

Compared with the hectic activity going on in other steel markets, tubular goods sales continue to reflect only a fair demand, with the possible exception of merchant pipe requirements, according to reports from PITTSBURGH. A moderate proportion of standard pipe demand, as reported before, emanates from national defense projects.

One of the largest recent pipeline orders—3000 tons—was received this week by a CHICAGO producer. Pipe business, though not as strong as other items, is enjoying a steady demand there.

Production schedules at CLEVELAND include a large tonnage of boiler tubes for Great Britain.

Merchant Bars

... Demand heavy and deliveries usually run into January

Except possibly for some odd sizes, PITTSBURGH bar makers have no room on rolling mill schedules for the rest of this year. Business being placed now is at price at time of shipment and promises in some instances run well into January. Demand in the past two weeks has been exceptionally heavy and sales figures at PITTSBURGH reflect a considerable increase over the same period last month. Requirements are widely diversified and tonnage on individual orders is greater than a month ago. Pressure for deliveries is being exerted by cold drawers, bolt and nut manufacturers, and automobile makers.

Bar activity with CHICAGO producers continues its extremely heavy pace, with demand strong from every direction. Both the carbon and alloy variety continue to build up in backlogs and mills experience increasing difficulty with deliveries. One steel maker promises four to six weeks for the rolling of alloy bars but will state nothing definite about the heat treating involved—this being handled according to each order.

At CLEVELAND the merchant bar market continues tight. Cold finished bar sales also remain brisk. Picatinny Arsenal received bids, Nov. 18, on approximately 2000 tons of cold drawn bars for delivery starting in early January, which



It's a "DUNKING" SYSTEM for RED HOT METAL

Raising and lowering is done at speed of 32' per second.

THE trick here is to snatch red hot metal parts out of a furnace and "dunk" them into a tank of oil quickly before they catch a chill. It's a simple, efficient system devised to protect the temper of metals through fast handling.

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would seem to disprove recently published reports that arsenals are well supplied with cold drawn bars for the next two years. It is estimated at CLEVELAND that barely 20 per cent of the Government program's cold drawn bar requirements have been placed so far.

Wire Products

... Mills well sold up for remainder of quarter

An inquiry totaling between \$300,000 and \$400,000 worth of armor piercing projectiles for anti-tank guns was circulated this week at CHICAGO. Heavy demand for wire products throughout the entire list is extending deliveries sharply. Mills are generally booked up for the remainder of the year with general demand bolstered now in that district by strong defense business.

Having booked as much wire and wire tonnage as can be shipped during the remainder of this quarter, PITTSBURGH mills are taking tonnage at price at time of shipment when consumers insist on business being accepted.

Plates

... Unfilled orders heavier than a month ago

Unfilled plate tonnage at PITTSBURGH is greater than it was a month ago, orders are held in check only by the willingness of consumers to accept extended delivery promises, and plate mills are operating at practical capacity. The rapid rise in the volume of sheet and strip business in the past month has created a more difficult situation with regard to scheduling plates on the high-speed mills.

Tank construction, building—both private and governmental—and railroad buying are contributors to the heavy pace set by the plate business at CHICAGO. Deliveries are extended in all sizes ranging from nine to 11 weeks at some mills, while one steelmaker is quoting deliveries for the second quarter of 1941 on sheared plates, 84 in. to 150 in.

Sales at CLEVELAND and YOUNGSTOWN continue brisk and delivery promises are extended well into first quarter.

Some eastern mills have ceased to absorb freight on plates, the mill price being quoted for deliv-

eries at the producer's convenience.

Steady requirements for car repairs, hull work at shipyards, boiler and heating equipment manufacture, and warehouse purchases are resulting in a demand for plates from eastern Pennsylvania producers which is of even larger proportions than that of October.

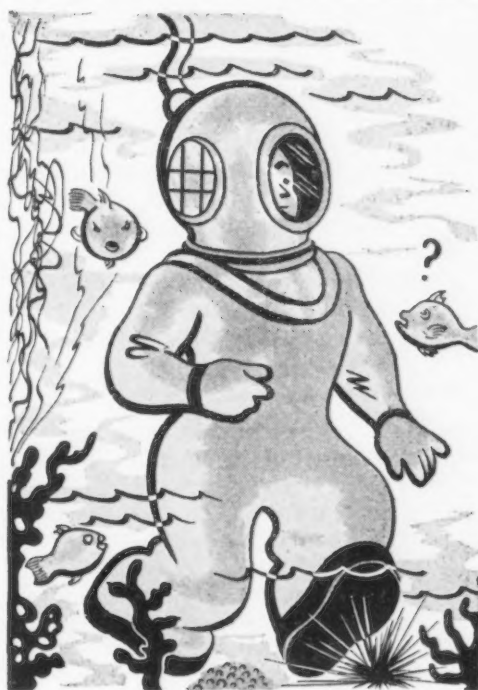
Steel Tank & Pipe Co. of Oregon will fabricate plant equipment for plant expansion of Aluminum Co. of America at Vancouver, Wash.,

requiring more than 1275 tons of plates.

Tin Plate

... Operations up slightly ... mill inventories still large

Tin plate operations are estimated at 49 per cent, up one point from a week ago. Cold reduction mills continue to operate at approximately 73 per cent.



METAL FINISHERS WORK UNDER PRESSURE TOO!

There's no way of measuring how many pounds of pressure per square inch metal finishers work under, but there's no question that day in and day out the pressure is on.

Time allowances are shortened, new finishes demand new metal cleaners and that puts pressure on the men in charge of metal finishing.

Here's a good way to reduce that pressure to normal, to keep metal cleaning costs low and results high—just keep in touch with your Wyandotte Service Representative . . . he's in touch with metal finishing problems all the time . . . he has the resources of the whole Wyandotte organization behind him . . . and he is on call twenty-four hours a day.

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Machine Tools

... SALES, INQUIRIES AND MARKET NEWS

Production Still the Problem

Cincinnati

••• Production problems continue to be the chief interest in the machine tool industry here. With business continuing at a steadily brisk pace and each day adding to the flock of orders already booked, manufacturers discuss and ponder ways and means of meeting purchaser requirements. The bulk of business coming in has some type of priority requirements so that in many instances the priority means little, because there are so many similar orders booked ahead. A number of manufacturers have plans for plant expansion which have not yet reached the blueprint stage. Of course, the labor problem continues to be an acute one, but with the learner and apprentice programs being pressed hard, some measure of relief is being obtained.

Minor Fluctuations Reported

Cleveland

••• While projects are still pouring into the hopper, a few sellers report orders have slackened in this immediate vicinity.

Such a fluctuation can only be temporary, as the trend of demand should remain strong for months to come. The delivery situation, of course, is not inducive to the purchase of some types of machine tools. One dealer is quoting 1942 delivery on horizontal boring mills. Used machinery is moving briskly, recent purchases including a large order from the British here.

United Engineering & Foundry has been buying for its Youngstown shop. Lima Locomotive is believed to be figuring on getting into the manufacture of Army tanks. Weatherhead Co., here, has landed a \$1,000,000 order for ammunition.

Backlogs Still Climb

New York

••• Orders in this area continue well ahead of shipments and backlogs at machine tool builders' plants are still on the increase, with deliveries getting longer. Practically no consideration is being given to non-defense buyers. In one instance, machines already on order are being loaned to defense contractors outside this ter-

ritory and new shipping instructions have been issued to dealers, raising the problem of split commissions which is largely governed by the length of time on loan.

Formal orders are now coming through in connection with the \$20,000,000 worth of machine tools purchased last month by the Wright Aeronautical Corp. for its Lockland, Ohio, plant. Some of the equipment is being diverted to a newly acquired plant in Paterson, formerly a textile mill. As a result, fresh buying is expected for the Ohio plant.

Non-Defense Buyers Suffer

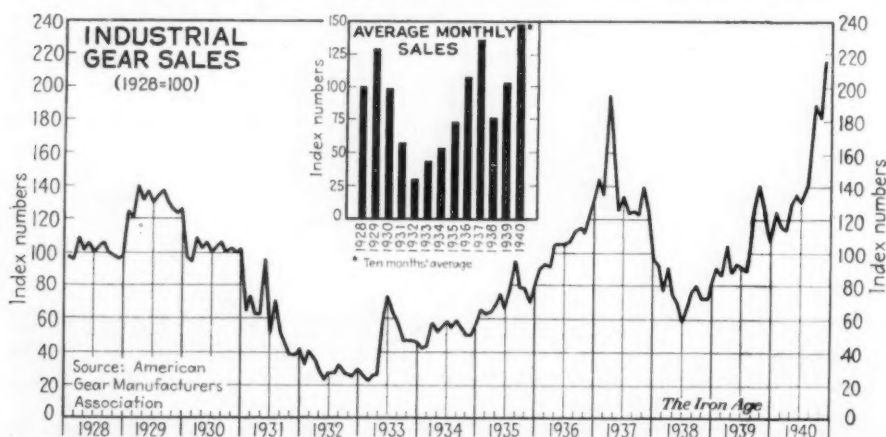
Chicago

••• Although the machine tool industry in this area is just now feeling the heavy effect of direct defense business, general demand has been keeping pace with defense orders to provide the industry with its heavy load. Now, however, machines ready for delivery to non-defense customers are being sent, instead, to defense contractors. This happened last week, for example, to a farm implement builder.

Most manufacturers are sold out on standard machines for the first half of 1941. Many standard models are being offered for as late as November, 1941. Special equipment is commonly quoted for 1942 delivery. Numerous buying programs resulting from defense program alone are ready for launching but delivery is, of course, the paramount issue.

October Gear Sales At All-Time High

SALES of industrial gears, exclusive of automotive gears, in October were the largest on record, according to the index compiled by the American Gear Manufacturers Association. The October index, 216, was 18 per cent above September and 53 per cent higher than October, 1939. Previous all-time high, occurring in March, 1937, was 195, which the October, 1940, figure exceeds by 10.8 per cent. The index, which had risen sharply from 141 in July to 191 in August, dipped slightly in September to 183, but recovered abruptly in the past month to establish the new record. Average index for the first 10 months of the current year is 147, 47 per cent above the corresponding period in 1939, for which the average index was 100.4.



Columbia Axle Co. Sold To Cincinnati Men

••• Purchase of Columbia Axle Co., Cleveland, from Aviation & Transportation Corp., by Walter E. Schott and Louis Goldsmith, Cincinnati manufacturers, was announced today by the new owners. Mr. Schott is president of J. H. Fay & Egan Co., manufacturers of wood working machinery, Cincinnati, and Mr. Goldsmith is owner of the Hisey-Wolf Machine Co., Cincinnati, makers of portable electric tools and grinders.

Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

New York, Nov. 19—A quieter spirit pervaded all major non-ferrous markets in the past week and sales declined generally to levels below those of the week previous. Apportioning policies of copper and zinc producers continue in effect, and lead sellers are still forced to postpone a certain amount of business each day. Tin prices have declined steadily toward the government buying price. Copper statistics showed a further drop of 20,695 tons in refined stocks to 164,618 tons at the end of October, as compared with 185,313 at the end of September. Since the end of July when stocks were at the year's high of 215,823 tons, they have declined roughly 51,000 tons. Domestic deliveries in October of 103,771 tons were at an apparent all-time high, exceeding September shipments by 7286 tons. Refinery production was relatively unchanged at 83,076 tons.

Against estimated total domestic copper requirements for 1949 of roughly 1,200,000 tons, probable domestic output is placed at around 1,080,000 tons. The difference will be made up in imports of metal from American-owned mines in South America, according to a tentative agreement reached by government officials, producers and consumers. Contracts include a clause providing for the cancellation of shipments to Japan should the metal be required by this country.

The copper market in the past week was substantially unchanged from two weeks ago, with producers continuing to allocate metal on the basis of 12c. per lb., delivered Valley for electrolytic material. Custom smelters asked 12.625c. during the week for fourth quarter delivery, but sales in this direction were not large. The export market held to 10c. per lb., f.a.s., transactions involving only small tonnages.

Lead

The recent period of heavy buying tapered off at the end of the past week and the present week began with a definitely more quiet

spirit in the market. There were no further price advances during the week, the market remaining very firm at 5.80c. per lb., New York.

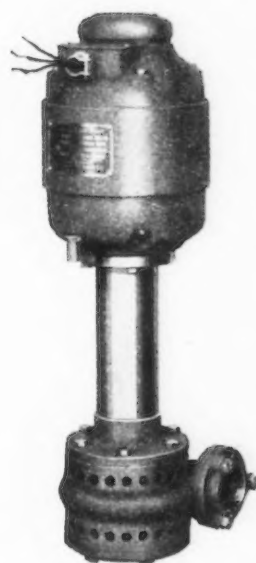
Zinc

Except for still greater tightness in the nearby supply situation which has already made material for shipment during the remainder of the year all but impossible to obtain, the market during the past week was substantially unchanged from that of the previous week. All producers continue to quote 7.64c. per lb., delivered New York, and all present indications point to an indefinite continuance of that price. Consumers would undoubtedly be willing to pay more but, since production facilities are already being strained to the utmost, such a

move would not improve the present situation. Sales of prime Western were down considerably from the week previous, amounting to only 3669 tons, as compared with 13,600 tons. Shipments were also down from 6200 tons to 5735 tons. Backlogs now stand at 116,092 tons.

Tin

The market was even less active in the week just finished than it was in the preceding period. At 50.75c. Wednesday, the price slumped successively lower on the days following to 50.50c. on Friday. This week opened with prompt Straits metal quoted at 50.5375c. per lb., delivered New York, the level prevailing today. December delivery has been offered at 50.30c., January at 50.25c. and February shipment at 50.125c.



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Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

Indications that a conflict is developing between efforts to stabilize the market at the general level which held through October and the need of higher prices to draw out larger tonnages of scrap to satisfy the exceptionally heavy domestic needs were in evidence in a number of districts this week.

A shortening of the range on No. 1 at Pittsburgh, and a 25c. rise at Chicago, have advanced THE IRON AGE composite 17c. this week to \$20.92. This represents the second consecutive rise from \$20.67 at which point the composite had held for four successive weeks.

The elimination of Japan from the export market and the sharp reduction in the rate of British shipments in recent weeks have to all effects removed the export factor from the market and present strength is entirely a reflection of domestic factors.

Cast items are especially strong and increases in cast scrap, both open hearth and foundry grades, have occurred in most districts. Buffalo prices are up 50c. this week on practically the entire list, while Cleveland has advanced a similar amount in secondary grades. Cincinnati is also higher, while mixed trends have developed at St. Louis. Pittsburgh and Chicago continue very strong, with numerous advances indicated at the latter point. At Pittsburgh the only changes have been in prime melting grades.

It is interesting to note that the present price at Chicago is exactly the same as that recorded during the peak of 1939, while the present Pittsburgh and Philadelphia quotations are \$2.50 and \$2.25 respectively lower than the 1939 peak.

Pittsburgh

The market continues exceptionally strong and brokers who have been offering \$20.50 and \$21 a ton for No. 1 heavy melting have been unable to get much if any material at these prices. The dollar spread of \$21 to \$22 a ton on No. 1 heavy melting steel, which has been carried for several weeks, has been eliminated and this grade is now quotable at \$21.50 to \$22 a ton, up 25c. from last week's average. One point of consumption in the

district is paying the top range or better for No. 1 heavy melting.

Chicago

No. 1 heavy melting moved up 25c. this week to \$20 to \$20.50 on the basis of broker-mill transactions. There have been reports of a broker-dealer sale at \$20.75 but these lack confirmation. The market undertone continues on a very firm basis.

Philadelphia

Mills do not appear to be showing much anxiety over the condition of stock piles and are taking in scrap at a rate about sufficient to cover operations. Prices on No. 1 and No. 2 steel are unchanged, although increased tightness of supply in the cast market resulted in higher levels there. Mixed yard cast is up 50c. to \$19.50 to \$20, while stove plate is quoted at \$18.50 flat, cast borings at \$15 to \$15.50, and shaftings \$25.50 to \$26.

Youngstown

Scrap shows a tendency to become tighter here, probably due to continued high operations at open hearths, the flurry of cold weather and the fact the vessel season on the Great Lakes is drawing to a close. Railroad scrap from Cleveland is reported to have commanded between \$22 and \$22.50 for shipment here a week ago.

Cleveland

While it is understood \$21.50 has been paid by a mill here for a tonnage, there is confusion at the start of this week as to whether the material might not be a premium grade. A purchase of blast furnace scrap at around \$15 is recognized. It is understood the bundles from a large automotive plant here, ordinarily considered a premium grade, did not command as high a price as in October.

Buffalo

Leading scrap items moved up \$1 a ton in the past week on the basis of sales. The latest sale was within the \$21 to \$21.50 range. The differentials between No. 1 steel and No. 2 steel, new heavy bundled sheets, and drop forge flashings are lowered from \$2 to \$1.50. The market here maintains its strong tone despite the fact that the leading consumer has had no bid out since last week's purchase.

St. Louis

An undisclosed tonnage of No. 2 heavy melting steel was sold during the week at 25c. higher than the preceding sale. A few other items were up 50c. The tone of the market is strong, with shipments from the country tightening up.

Cincinnati

Tension in the market here continues to mount, with efforts to maintain a

stable price level conflicting with the necessity of raising offering prices in order to draw out sufficient material for the district's needs. Although the desire for stabilization tends to prevent too aggressive bidding, the list is up another 50c. here this week on all items.

Birmingham

Cast iron carwheels have advanced \$3 a ton here, but prime melting material is unchanged. Stocks of all scrap grades are at lowest point in three years while demand remains at a peak level.

Detroit

Reluctance of even the smallest consumers in this area to buy is having a continuing depressive effect on the market here. In the absence of major automotive lists until the end of the month, prices for the most part are moving sideways. Minor adjustments are being made but none are of outstanding significance.

New York

Certain Eastern Pennsylvania consumers are temporarily glutted with supplies, the result being a hold-up in car releases and a lessening in price buoyancy in this area, although major quotations are unchanged. Some specialties, on the other hand, continue active and a few upward revisions in quotations have been made. Export trade is very spotty and of no influence in the current situation.

Boston

Business is less active and prices on usually active items are easier. Three Pennsylvania consumers of steel turnings have withdrawn from the market and prices are off 25c. to 50c. Bundled skeleton and shafting prices are easier following withdrawal of the big eastern Pennsylvania buyer from the market. Less consumers' interest in blast furnace material has lowered the price 25c. Both the domestic and export, No. 1 and 2 steel markets are holding firm, however. Washburn Wire Co. has bought No. 1 steel at \$17.50, delivered. Stove plate prices are firmer.

Toronto

Heavy demand for all types of scrap dominates this market. Large shipments from the United States are expected in Canadian ports before navigation closes. Important orders for low phosphorous scrap are reported from points where electric furnaces are in operation. In consequence, dealers have advanced prices 50c. and now are offering \$13 for electric furnace material delivered Toronto yards. A similar advance has been made on stove plate, with dealers now bidding \$15.75. Heavy melting steel is in brisk demand by Hamilton mills and cast scrap is moving freely to consumers at various points in Ontario.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$21.50 to \$22.00
Railroad heavy mltng.	22.50 to 23.00
No. 2 heavy mltng.	20.00 to 20.50
Railroad scrap rails	23.00 to 23.50
Rails 2 ft. and under	27.00 to 27.50
Comp. sheet steel	21.50 to 22.00
Hand bundled sheets	20.00 to 21.00
Heavy steel axle turn	20.75 to 21.25
Heavy steel forge turn	19.75 to 20.25
Machine shop turnings	15.50 to 16.00
Short Shov. Turn. Alloy	
Free	17.00 to 17.50
Mixed bor. & turn.	14.75 to 15.25
Cast iron borings	15.00 to 15.50
Cast iron carwheels	22.50 to 23.50
Heavy breakable cast	17.00 to 17.50
No. 1 cupola cast	22.00 to 22.50
RR. knuckles & coup.	27.50 to 28.00
Rail coil springs	27.50 to 28.00
Rail leaf springs	27.50 to 28.00
Rolled steel wheels	27.50 to 28.00
Low phos. billet crops	27.00 to 27.50
Low phos. punchings	27.00 to 27.50
Low phos. heavy plate	25.00 to 26.00
Railroad malleable	24.50 to 25.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$20.50 to \$21.00
No. 2 hvy. mltng. steel	19.50 to 20.00
Hydraulic bund., new	20.50 to 21.00
Hydraulic bund., old	17.50 to 18.00
Steel rails for rolling	25.00 to 26.00
Cast iron carwheels	23.00 to 23.50
Hvy. breakable cast	21.50
No. 1 cupola cast	22.50 to 23.00
Mixed yard (f'd'y) cast	19.50 to 20.00
Stove plate (steel wks.)	18.50
Railroad malleable	22.50 to 23.00
Machine shop turn	14.50 to 15.00
No. 1 blast furnace	13.00 to 13.50
Cast borings	15.00 to 15.50
Heavy axle turnings	19.00 to 19.50
No. 1 low phos. hvy.	25.50 to 26.00
Couplers & knuckles	25.50 to 26.00
Rolled steel wheels	25.50 to 26.00
Steel axles	25.00 to 25.50
Shafting	25.50 to 26.00
Spec. iron & steel pipe	18.00 to 18.50
Cast borings (chem.)	15.00

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton

Hvy. mltng. steel	\$20.00 to \$20.50
Auto. hvy. mltng. steel	
alloy free	19.00 to 19.50
No. 2 auto steel	16.50 to 17.00
Shoveling steel	20.00 to 20.50
Factory bundles	19.50 to 20.00
Dealers' bundles	18.00 to 18.50
No. 1 busheling	19.00 to 19.50
No. 2 busheling, old	11.50 to 12.00
Rolled carwheels	23.50 to 24.00
Railroad tires, cut	23.00 to 23.50
Railroad leaf springs	23.00 to 23.50
Steel coup. & knuckles	23.00 to 23.50
Axle turnings	19.25 to 19.75
Coil springs	24.50 to 25.00
Axle turn. (elec.)	19.75 to 20.00
Los phos. punchings	23.00 to 23.50
Low phos. plates 12 in. and under	22.75 to 23.25
Cast iron borings	13.50 to 14.00
Short shov. turn.	14.00 to 14.50
Machine shop turn	14.50 to 15.00
Rerolling rails	24.00 to 24.50
Steel rails under 3 ft.	23.00 to 23.50
Steel rails under 2 ft.	23.75 to 24.25
Angle bars steel	22.75 to 23.25
Cast iron carwheels	20.75 to 21.25
Railroad malleable	23.50 to 24.00
Agric. malleable	17.50 to 18.00

Per Net Ton

Iron car axles	\$24.50 to \$25.00
Steel car axles	24.00 to 24.50
Locomotive tires	18.00 to 18.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast	17.75 to 18.25
Clean auto. blocks	18.00 to 18.50
No. 1 railroad cast	17.50 to 18.00
No. 1 agric. cast	16.00 to 16.50
Stove plate	13.00 to 13.50
Grate bars	14.00 to 14.50
Brake shoes	14.25 to 14.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$21.50 to \$22.00
No. 2 hvy. mltng. steel	20.50 to 21.00
Low phos. plate	24.00 to 24.50
No. 1 busheling	20.75 to 21.25
Hydraulic bundles	21.00 to 21.50
Machine shop turn	14.00 to 14.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$20.50 to \$21.00
No. 2 hvy. mltng. steel	19.50 to 20.00

Comp. sheet steel	\$20.00 to \$20.50
Light bund. stampings	16.50 to 17.00
Drop forge flashings	19.25 to 19.75
Machine shop turn	13.00 to 13.50
Short shov. turn	13.50 to 14.00
No. 1 busheling	19.75 to 20.25
Steel axle turnings	20.00 to 20.50
Low phos. billet and bloom crops	25.00 to 25.50
Cast iron borings	14.50 to 15.00
Mixed bor. & turn	14.50 to 15.00
No. 2 busheling	14.50 to 15.00
No. 1 cupola cast	22.00 to 22.50
Railroad grate bars	15.50 to 16.00
Stove plate	15.50 to 16.00
Rails under 3 ft.	25.00 to 26.00
Rails for rolling	25.00 to 25.50
Railroad malleable	24.50 to 25.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$21.00 to \$21.50
No. 2 hvy. mltng. steel	19.50 to 20.00
Scrap rails	22.50 to 23.00
New hvy. b'ndled sheets	19.50 to 20.00
Old hydraul. bundles	18.00 to 18.50
Drop forge flashings	19.50 to 20.00
No. 1 busheling	19.00 to 19.50
Machine shop turn	13.50 to 14.00
Shov. turnings	14.50 to 15.00
Mixed bor. & turn	13.50 to 14.00
Cast iron borings	13.50 to 14.00
Knuckles & couplers	25.00 to 25.50
Coil & kaf springs	25.00 to 25.50
Rolled steel wheels	25.00 to 25.50
No. 1 machinery cast	20.50 to 21.00
No. 1 cupola cast	19.00 to 19.50
Stove plate	17.00 to 17.50
Steel rails under 3 ft.	25.50 to 26.00
Cast iron carwheels	18.50 to 19.50
Railroad malleable	24.00 to 24.50
Low phos. plate	26.00 to 27.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$17.25 to \$17.75
No. 1 hvy. melting	17.25 to 17.75
No. 2 hvy. melting	16.25 to 16.75
No. 1 locomotive tires	20.50 to 21.00
Misc. stand. sec. rails	21.25 to 21.75
Railroad springs	22.00 to 22.50
Bundled sheets	13.50 to 14.00
Cast bor. & turn	10.00 to 10.50
Machine shop turn	11.00 to 11.50
Heavy turnings	13.25 to 13.75
Rails for rerolling	22.50 to 23.50
Steel car axles	24.00 to 24.50
No. 1 RR. wrought	14.50 to 15.00
No. 2 RR. wrought	16.50 to 17.00
Steel rails under 3 ft.	23.75 to 24.25
Steel angle bars	21.00 to 21.50
Cast iron carwheels	20.50 to 21.00
No. 1 machinery cast	20.00 to 20.50
Railroad malleable	20.50 to 21.00
Breakable cast	17.75 to 18.25
Stove plate	14.00 to 14.50
Grate bars	13.50 to 14.00
Brake shoes	14.50 to 15.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	\$16.75 to \$18.25
No. 2 hvy. mltng. steel	15.25 to 15.75
Scrap rails for mltng.	22.25 to 22.75
Loose sheet clippings	12.00 to 12.50
Hyd'lic bundled sheets	16.00 to 16.50
Cast iron borings	8.25 to 8.75
Machine shop turn	9.25 to 9.75
No. 1 busheling	12.75 to 13.25
No. 2 busheling	7.00 to 7.50
Rails for rolling	23.75 to 24.25
No. 1 locomotive tires	19.00 to 19.50
Short rails	24.25 to 24.75
Cast iron carwheels	18.25 to 18.75
No. 1 machinery cast	20.75 to 21.25
No. 1 railroad cast	19.25 to 19.75
Burnt cast	12.75 to 13.25
Stove plate	12.75 to 13.25
Agricul. malleable	17.25 to 17.75
Railroad malleable	20.25 to 20.75
Mixed hvy. cast	18.00 to 18.50

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	\$18.00
No. 2 hvy. melting steel	17.00
No. 1 busheling	16.00
Scrap steel rails	17.00
Steel rails under 3 ft.	19.50
Rails for rolling	20.00
Long turnings	7.50
Cast iron borings	8.50
Stove plate	12.00
Steel axles	18.00
No. 1 RR. wrought	16.00
No. 1 cast	18.00
No. 2 cast	13.00
Cast iron carwheels	20.00
Steel carwheels	18.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	\$16.00 to \$16.50
No. 2 heavy melting	15.00 to 15.50
Borings and turnings	11.50 to 12.00
Machine shop turnings	11.00 to 11.50
Long turnings	9.50 to 10.00
Short shov. turnings	12.00 to 12.50
No. 1 cast	18.50 to 19.00
Automotive cast	18.50 to 19.00
Hvy. breakable cast	14.50 to 15.00
Stove plate	12.00 to 12.50
Hydraul. comp. sheets	18.00 to 18.50
New busheling	16.00 to 17.00
Sheet clips	13.75 to 14.25
Flashings	16.00 to 16.50
Low phos. plate	19.50 to 20.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$16.00 to \$16.50
No. 2 hvy. mltng. steel	15.00 to 15.50
Hvy. breakable cast	17.00 to 17.50
No. 1 machinery cast	18.50 to 19.00
No. 2 cast	15.50 to 16.00
Stove plate	13.50 to 14.00
Steel car axles	20.00 to 21.00
Shafting	20.00 to 20.50
No. 1 RR. wrought	15.50 to 16.00
No. 1 wrought long	14.50 to 15.00
Spec. iron & steel pipe	13.00 to 13.50
Rails for rolling	20.00 to 20.50
Clean steel turnings*	10.00 to 10.50
Cast borings*	10.00 to 10.50
No. 1 blast furnace	9.00 to 9.50
Cast borings (chem.)	11.00 to 11.50
Unprepared yard scrap	8.50 to 9.00
Light iron	6.50 to 7.00

Per gross ton delivered local foundries:
No. 1 machin. cast...\$19.00 to \$19.50
No. 2 cast...16.50 to 17.00

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

Breakable cast	\$15.50 to \$15.75
Machine shop turn	9.00 to 9.25
Mixed bor. & turn	8.00 to 8.50
Bun. skeleton long	12.00 to 12.50
Shafting	19.50 to 19.75
Stove plate	12.75 to 13.00
Cast bor. chemical	9.50 to 9.75

Per gross ton delivered consumers' yards:

Textile cast	\$20.00 to \$21.00
No. 1 machine cast	20.00 to 20.75

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	\$15.50 to \$15.75
No. 2 steel	14.50 to 14.75

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	\$14.25	\$13.25	\$15.00
No. 2 hvy. mltng. steel		12.00	
Bundles		10.00	

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	\$13.00	\$12.50
No. 1 hvy. mltng. steel	11.25	10.75
No. 2 hvy. mltng. steel	10.00	9.75
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.50	7.00
Cast borings	7.50	7.00
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	15.75	15.25

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered barges

No. 1 hvy. mltng. steel	\$16.00
No. 2 hvy. mltng. steel	15.00
No. 2 cast	\$15.00 to 15.50
Stove plate	13.00 to 13.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	\$17.00
No. 2 hvy. mltng. steel	15.50
Rail (scrap)	17.00 to 17.25

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel	Nominal
No. 2 hvy. mltng. steel	Nominal

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Awards slightly lower at 22,725 tons against 25,300 tons last week; new projects advance to 41,910 tons from 37,925 tons a week ago; plate awards call for 2600 tons.

AWARDS

NORTH ATLANTIC STATES

- 750 Tons, Schenectady, N. Y., highway bridge, to American Bridge Co., Pittsburgh, through Fred Berianti & Son, Harrison, N. Y.
- 450 Tons, New York, six-story apartment house, Riverside Drive, 158th-161st Streets, to Dreier Structural Steel Co., New York.
- 400 Tons, Philadelphia, alterations on low cranes for Government, to American Bridge Co., Pittsburgh.
- 325 Tons, Philadelphia, administration building, Frankford Arsenal, to Bethlehem Steel Co., Bethlehem, Pa.
- 315 Tons, Parlin, N. J., power house for Hercules Powder Co., to American Bridge Co., Pittsburgh.
- 280 Tons, Annapolis, Md., four radio towers, to Weatherly Steel Co., Weatherly, Pa.
- 160 Tons, Annapolis, Md., dormitory addition for Naval Academy, to Frank M. Weaver Co., Lansdale, Pa., through Henry W. Horst Co., Philadelphia, general contractor.
- 110 Tons, Philadelphia, addition to Army military shell shop, building No. 55, to Frank M. Weaver Co., Lansdale, Pa., through Henry W. Horst Co., Philadelphia, general contractor.

THE SOUTH

- 1500 Tons, San Antonio, Tex., Duncan Field depot supply building for War Department, to Mosher Steel Co., Dallas, Tex.
- 500 Tons, San Antonio, Tex., Duncan Field engine repair building for War Department, to Mosher Steel Co., Dallas, Tex.
- 184 Tons, East Laport, N. C., power house for Nantahala Power & Light Co., to Ingalls Iron Works Co., Birmingham.
- 132 Tons, Hopewell, Va., pipe line supports for Solvay Process Co., to Ingalls Iron Works Co., Pittsburgh plant.

CENTRAL STATES

- 5000 Tons, Wilmington, Ill., du Pont munitions plant, to Duffin Iron Co., Chicago.
- 1200 Tons, Cincinnati, Cincinnati Milling Machine Co. expansion, to Pittsburgh-Des Moines Steel Co., Pittsburgh, through Austin Co., Cleveland.
- 215 Tons, Table Rock, Neb., State highway to Omaha Steel Works, Omaha, Neb.

WESTERN STATES

- 3000 Tons, Seattle, Boeing Airplane Co. plant addition, to Pacific Car & Foundry Co., Seattle.
- 2500 Tons, Orchard Point, Wash., H-piling for Navy project, to Bethlehem Steel Co., Seattle, through Austin Co., Seattle, contractor.

- 1000 Tons, Lincoln, Wash., Spokane River bridge on State Road 22, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan., through C & F Teaming & Trucking Co., Butte, Mont.

- 955 Tons, Los Angeles, Los Angeles River bridge for Los Angeles Junction Railway Co. tracks (United States Engineer's project), to Columbia Steel Co., San Francisco, through Oberg Brothers, Los Angeles, contractors.

- 612 Tons, Oregon and Washington points, substation bus structures for Bonneville Administration (Invitation 1464), to Bethlehem Steel Co., San Francisco.

- 400 Tons, Anchorage, Alaska, elevated tank at Elmendorf Field for Army (Invitation QM-6813-41-76), to Pittsburgh-Des Moines Steel Co., Seattle; tonnage includes plates.

- 350 Tons, Los Angeles, addition to building No. 9, Aluminum Co. of America, to Pacific Iron & Steel Co., Los Angeles.

- 300 Tons, Bonneville, Ore., transmission towers, Bonneville-Tre Dalles line (Invitation 1313), to Bethlehem Steel Co., San Francisco, through Fritz Ziebarth, Vancouver, Wash., contractor.

- 275 Tons, Vernon, Cal., Byron Jackson Co. warehouse, to Bethlehem Steel Co., Los Angeles.

- 200 Tons, Oakland, Cal., administration building, cafeteria, and heating plant at Navy Supply Depot (Specifications 10, 172), to Independent Iron Works, Oakland, Cal., through James I. Barnes Construction Co., Santa Monica, Cal., contractor.

- 195 Tons, Orem, Cal., Union Oil Co. building, to Consolidated Steel Corp., Los Angeles.

WESTERN STATES

- 175 Tons, Seattle, telephone building, to Poole & McGonigle, Portland, Ore.

- 142 Tons, Lake Wenatchee, Wash., bridge over Wenatchee River on Sectional State Road 15-C, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan., through C & F Teaming & Trucking Co., Butte, Mont., contractor.

- 137 Tons, Keyport, Wash., ammunition industrial buildings at Navy Torpedo Station, to Isaacson Iron Works, Seattle, through Dally Construction & Engineering Co., and C. F. Dally, Seattle, contractors.

- 136 Tons, Seattle, municipal bus sheds, to Wisconsin Bridge & Iron Co., Milwaukee, through Gjarde Construction Co., Seattle, contractor.

- 100 Tons, Muroc, Cal., elevated tank at Army bombing range, to Pittsburgh-Des Moines Steel Co., Los Angeles; tonnage includes plates.

- 100 Tons, Dean, Wash., undercrossing on State Highway No. 6, to Pacific Car & Foundry Co., Seattle, through Charles A. Power, Spokane, Wash., contractor.

- 100 Tons, Salt Lake City, elevated tank for Army at municipal airport, to Pittsburgh-Des Moines Steel Co., San Francisco; tonnage includes plates.

- Unstated tonnage, Coram, Cal., two 250-ton cranes for Shasta power plant (Bureau of Reclamation Specification 929), to Lakeside Bridge & Steel Co., Milwaukee.

HAWAII

- 500 Tons, Hickam Field, T. H., engine repair shop (Invitation QM-6812-41-9), to Consolidated Steel Corp., Los Angeles, through Walker & Moody, Honolulu, contractors.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 6000 Tons, Philadelphia, shipways for New York Shipbuilding Corp.; Merritt, Chapman & Scott, general contractors.
- 1700 Tons, Boston, shop building for Navy Department.
- 1500 Tons, Camden, N. J., turret shop for New York Shipbuilding Corp.
- 700 Tons, Brooklyn, contract No. 4, construction shaft, Brooklyn Tunnel.
- 400 Tons, Philadelphia, research laboratory for Frankford Arsenal.
- 300 Tons, Irvington, N. J., manufacturing building for Irvington Smelting & Refining Works.
- 275 Tons, Willowbrook, N. Y., mental defective school for State.
- 250 Tons, Niagara Falls, N. Y., unnamed project.
- 230 Tons, Wellsville, N. Y., building for Air Preheater Corp.
- 220 Tons, Brooklyn, Kings County Hospital power house.
- 175 Tons, Baltimore, land plane hangar No. 1 and shops for city.
- 155 Tons, Glen Head, L. I., coal bunker for Long Island Lighting Co.

THE SOUTH

- 1200 Tons, Jefferson Island, La., process plant for Jefferson Island Salt Mining Co.
- 614 Tons, State of Oklahoma, highway bridges; bids Dec. 17.
- 375 Tons, Spring City, Tenn., intake gates, Watts Bar project for TVA.
- 160 Tons, Douglas, Ariz., reverberatory furnace for Phelps Dodge Corp.

CENTRAL STATES

- 11,500 Tons, Ravenna, Ohio, shell loading plant; bids being taken.
- 1300 Tons, Cleveland, warehouse for Sears-Roebuck & Co.
- 1000 Tons, Akron, Ohio, airplane factory for Goodyear Tire & Rubber Co.
- 205 Tons, Dearborn, Mich., engine test building for Ford Motor Co.
- 200 Tons, West Salem, Wis., State bridge No. 552.
- 130 Tons, Chicago, hospital addition for South Chicago Community Hospital.
- 120 Tons, Dayton, Ohio, wind tunnel power building for War Department.

WESTERN STATES

- 8000 Tons, Grand Coulee Dam, Wash., to Covington, Wash., transmission towers for Bonneville Administration (Invitation 1522); bids Nov. 25.
- 3500 Tons, San Francisco, Navy assembly shop at Hunters Point (Specification 10172); bids taken.
- 1000 Tons, Dutch Flat, Cal., Pacific Gas & Electric Co. power plant.
- 550 Tons, Arsenal, Utah, dunnage for bomb storage for Government.
- 400 Tons, Earp, Cal., trash racks for Parker power plant, No. 1453-D for Bureau of Reclamation.

Weekly Bookings of Construction Steel

Week Ended	Nov. 19, 1940	Nov. 12, 1940	Oct. 22, 1940	Nov. 21, 1939	Year to Date	
					1940	1939
Fabricated structural steel awards	22,725	25,300	39,050	9,000	1,034,135	841,725
Fabricated plate awards	2,600	5,290	900	575	135,600	140,080
Steel sheet piling awards	0	0	2,735	0	65,180	75,365
Reinforcing bar awards	11,860	9,875	14,100	11,450	424,045	423,840
Total Letting of Construction Steel	37,185	40,465	56,785	21,025	1,658,960	1,481,010

FABRICATED PLATES

AWARDS

2600 Tons, Vancouver, Wash., pot shells and bins for Aluminum Co. of America, to Steel Tank & Pipe Co. of Oregon, Portland, Ore.

PENDING PROJECTS

5000 Tons, Coram, Cal., penstocks for Shasta Dam; bids by Bureau of Reclamation Jan. 2.
1000 Tons, Dutch Flat, Cal., penstocks for Pacific Gas & Electric Co. power plant.

Reinforcing Steel

Awards of 11,860 tons; 7050 tons in new projects

AWARDS

ATLANTIC STATES

1600 Tons, Cheektowaga, N. Y., Curtiss-Wright Corp. expansion, to Bethlehem Steel Co., Buffalo, through John W. Cowper Co., Inc., Buffalo.
1600 Tons, Washington, seven additional hangars, Gravelly Airport, to Bethlehem Steel Co., Bethlehem, Pa., through John McShain, Inc.
500 Tons, Fort Meade, Md., Army cantonment, to Bethlehem Steel Co., Bethlehem, Pa., through Consolidated Engineering Co.
305 Tons, Clearfield County, Pa., State highway project route 59, section 10, to Truscon Steel Co., Youngstown, through Midwest Construction Co.
200 Tons, Belvidere, N. J., Hercules Powder Co. plant, to Bethlehem Steel Co., Bethlehem, Pa., through Bechtel-McCone-Parsons.
150 Tons, Newport, R. I., Naval Torpedo Station improvements, to Bethlehem Steel Co., Bethlehem, Pa., through Tredennick-Billings.

SOUTH AND CENTRAL

1000 Tons, Norfolk, Va., Navy Yard supply piers, to Bethlehem Steel Co., Bethlehem, Pa., through McLean Construction Co.
500 Tons, Dearborn, Mich., Ford Motor Co. aircraft engine plant; Bryant & Detwiler, contractor, Ford to furnish and fabricate concrete bars.
300 Tons, Edgewood Arsenal, Harford County, Va., additional improvements, to Bethlehem Steel Co., Bethlehem, Pa., through Cummins Construction Co.
155 Tons, Camp Lee, Va., mesh, to Truscon Steel Co., Youngstown.
111 Tons, Fort Belvoir, Va., mesh for Government project, to Truscon Steel Co., Youngstown.
103 Tons, Savannah, Ga., mesh for airport, to Truscon Steel Co., Youngstown.
100 Tons, Camp Joseph T. Robinson, Ark., mesh, to Truscon Steel Co., Youngstown.
100 Tons, Cincinnati, warehouse for National Distilling Products Corp., to Truscon Steel Co., Youngstown.

WESTERN STATES

1000 Tons, Seattle, Boeing Aircraft Co. plant addition, to Bethlehem Steel Co., Seattle.
975 Tons, Los Angeles, Treasury Department Invitation 10,733, Schedule 71,849, as follows: 451 tons to Columbia Steel Co., Los Angeles; 304 tons to Bethlehem Steel Co., Los Angeles; 220 tons to Truscon Steel Co., Los Angeles.
890 Tons, Oakland, Cal., Navy cold storage building (Specification 9974), to Soule Steel Co., San Francisco, through K. E. Parker Co., San Francisco, contractor.
550 Tons, Cottage Grove, Ore., Cottage Grove Dam, to Judson Steel Corp., Oakland, Cal., through T. E. Connolly, San Francisco, contractor.
510 Tons, Alameda, Cal., mesh for naval air station, to Truscon Steel Co., Youngstown, Ohio.
500 Tons, Vancouver, Wash., Aluminum Co. of America plant addition, to Mercer Steel Co., Portland, Ore.
200 Tons, Los Angeles, Treasury Department Invitation A10,746, Schedule 72,295, to Bethlehem Steel Co., Los Angeles.
150 Tons, San Diego, Cal., Navy dwellings, to Ceco Steel Products Co., Los Angeles, through William Simpson Construction Co., Los Angeles, contractor.
124 Tons, Long Beach, Cal., San Gabriel River highway bridge, to Blue Diamond Corp., Los Angeles, through J. E. Had-dock, Ltd., Pasadena, Cal., contractor.

HAWAII

230 Tons, Hickam Field, T.H., air corps double hangar (Invitation QM-6812-41-

14)), to Columbia Steel Co., San Francisco, through Robert E. McKee, Los Angeles, contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

1200 Tons, Philadelphia, marine warehouse, Day & Zimmerman Co., Philadelphia, general contractor.
400 Tons, Newport, R. I., torpedo station administration building.
110 Tons, Trenton, N. J., building for American Radiator & Standard Sanitary Corp., Karno-Smith Co., Philadelphia, general contractor.
100 Tons, Manchester, Conn., Hockanum River State bridge.

SOUTH AND CENTRAL

100 Tons, Sewall's Point, Va., Norfolk & Western Railway warehouse; bids taken.
300 Tons, Little Rock, Ark., housing project.
300 Tons, Barberton, Ohio, Norton housing project; bids Dec. 11.
240 Tons, Peoria, Ill., bridge, Route 8.
229 Tons, State of Oklahoma, highway bridges; bids Dec. 17.
165 Tons, Cleveland, Nixon apartment building.

WESTERN STATES

1430 Tons, San Francisco, United States Engineer (Invitation 868-41-86); bids in.
440 Tons, Ogden, Utah, seven warehouses at Utah General Army Depot (Invitation QM-6585-41-48); bids in.
357 Tons, Union Gap, Wash., two bridges and one overcrossing on State roads 3 and 3-A; bids Dec. 2.
330 Tons, North Bend, Wash., three bridges on State road 2; bids taken.
315 Tons, French Camp, Cal., San Joaquin County hospital; bids in.
300 Tons, San Diego, Cal., destroyer base buildings; I. C. Curry and F. E. Young, San Diego, contractors.
200 Tons, Seattle, Naval Reserve Armory; bids in.
120 Tons, Ogden, Utah, engine test building at Hill Field; Mead & Mount, low bidders on general contract.
110 Tons, Reno, Nev., University of Nevada engineering building; bids in.

Pipe Lines

El Paso Natural Gas Co., Bassett Tower Building, El Paso, Tex., has approved plans for new welded steel pipe line from present main line at Curtiss, Ariz., to Fort Huachuca, Ariz., about 20 miles, for natural gas transmission for distribution at latter point. Work will be carried out by company forces.

Gas Corp. of Michigan, Mount Pleasant, Mich., has authorized immediate construction of new welded steel pipe line from Lake George, Mich., gas field to main pipe line system near Clare, Mich., about 15 miles, for natural gas transmission.

Cunningham Natural Gas Co., Hooker-Fulton Building, Bradford, Pa., plans pipe lines in connection with development of natural gas properties in Willing Township, Allegany County, N. Y., including gathering pipe line system and main transmission line.

Southern Pipe Line Co., 411 North Broadway, Corpus Christi, Tex., plans new 4-in. pressure pipe line from Gallagher, Tex., oil field to main line near Wade City, Jim Wells County, about eight miles, for crude oil transmission. Company is affiliated with Southern Minerals Corp., Corpus Christi.

Natural Gas Pipe Line of America, Inc., 20 North Wacker Drive, Chicago, will begin work soon on new welded steel pipe line from present main line near Geneseo, Ill., to Milwaukee, about 65 miles, for natural gas transmission. Contract for installation has been let to I. C. Little, Gulf States Building, Dallas, Tex.

Constructing Quartermaster, Hill Field, Ogden, Utah, asks bids until Nov. 29 for pressure pipe lines and other facilities for air corps gasoline fueling system (Circular 6585-77).

Wentworth Gas Co., Ltd., 82 King Street East, Hamilton, Ont., plans steel pipe line from present main line to Ancaster, Ont., and vicinity, for natural gas transmission. Cost over \$75,000.

Inglewood, Cal., will take bids Nov. 26 for 6615 ft. of 12-in. welded steel pipe line in Eucalyptus and Arbor Vitae Streets.

Pomona, Cal., has taken bids on 2000 ft. of 20-in. and 3500 ft. of 18-in. welded steel pipe, 1/4-in. wall thickness.

Long Beach, Cal., has awarded 2700 ft. of 8-in., 18,300 ft. of 10-in., 7300 ft. of 12-in., and 400 ft. of 18-in. pipe to Southern Pipe & Casing Co., Azusa, Cal.

Cast Iron Pipe

Blanco, Tex., plans pipe lines for water system; also pumping station and other water works installation. Cost about \$32,000. Financing is being arranged through Federal aid. H. R. F. Holland, Frost Bank Building, San Antonio, Tex., is consulting engineer.

Board of Public Works, Nashville, Tenn., plans new 16-in. main supply line from proposed 3,000,000-gal. concrete reservoir to connection with city system. Entire project to cost close to \$2,000,000.

General Purchasing Officer, Panama Canal, Washington, closes bids Nov. 26 for 30,000 ft. of 4-in., and 5000 ft. of 2-in. cast iron soil pipe. Also for 1648 unions, 145 galvanized malleable iron or steel unions, galvanized wrought iron or steel pipe straps, pipe fittings, pipe hangers, angle valves, check valves, gate valves, globe valves, pressure reducing valves, etc. (Schedule 4519).

Webster City, Wis., has voted favorably on project for extensions and improvements in water system, including pipe lines and other water works installation, to cost about \$90,000. Financing will be carried out through Federal aid. General Engineering Co., Portage, Wis., is consulting engineer.

LeClaire, Iowa, has called special election Dec. 2 to vote bonds for \$30,000 for pipe lines for water system and other water works installation. Cost about \$70,000, remainder of financing to be arranged through other sources.

Public Utility District No. 1, Wahkiakum County, Puget Sound, Wash., J. I. Maki, secretary, asks bids until Dec. 7 for 12,000 ft. of 6-in., 56,000 ft. of 4-in., and 17,000 ft. of 3-in. pipe, with fittings, gate valves, hose connections for fire hydrants, etc. Also for 50,000-gal. elevated steel tank on 140-ft. steel tower, low-lift pumping equipment and accessories, and 200 water meters. H. L. Gilbert, Couch Building, Portland, is consulting engineer.

Board of Water Commissioners, Leavenworth, Kan., plans 5940 ft. of 12-in. pipe, 2600 ft. of 10-in., 6330 ft. of 8-in., and 420 ft. of 6-in., for extensions in water system to Veterans' institution; also quantity of fittings. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Anson, Tex., will take bids at once, closing on or about Nov. 27, for approximately seven and one-half miles of cast iron pipe for water system, with alternate bids on concrete pipe; also other water works equipment. Freese & Nichols, Fort Worth, Tex., are consulting engineers.

Sacramento, Cal., has awarded 127 tons of 6-in. pipe to United States Pipe & Foundry Co., San Francisco.

Seattle, Wash., has awarded 658 tons of 6 to 12-in. pipe to United States Pipe & Foundry Co., San Francisco. Bids have been taken on 380 tons additional for West Myrtle Street mains.

United States Treasury Department, Los Angeles, has awarded 536 tons of 10-in. pipe to United States Pipe & Foundry Co., San Francisco, for Kearney Mesa, San Diego, Cal.; Department has taken bids on 226 tons of 12-in. pipe for Lynwood, Cal., under Invitation A10821.

Vancouver, Wash., has taken bids on 531 tons of 4 to 10-in. pipe for Minnehaha water system. Alternates on asbestos cement pipe and cast iron.

Alameda, Cal., has received low bid from American Cast Iron Pipe Co., San Francisco, on 230 tons of 16-in. Class A pipe.

Arcadia, Cal., has awarded 130 tons of 10-in. pipe to United States Pipe & Foundry Co., San Francisco.

Seattle has taken bids on 500 tons of 6, 8, 12 and 16-in. pipe for Fairview Avenue, North; 12th Street, Southwest, and other mains.

Oakland, Cal., East Bay Municipal Utility District, will take bids Nov. 27 on 119 tons of 4-in. and 765 tons of 6-in. pipe under L.S. 255.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (¹⁰)			
TERNES, M'FG.															
Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail) ⁷	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES										(Coatesville and Claymont = 2.10¢)					
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)									
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)						
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)						
Spring	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)						
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS															
Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lots to manufacturing trade. ¹⁰ Boxed.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Rerolling\$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

3 in. to 12 in.\$52.00
12 in. to 18 in. 54.00
18 in. and over. 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Open hearth or bessemer.....\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Grooved, universal and sheared. 1.90c.

Wire Rods

(No. 5 to 9/32 in.) Per Lb.
Pittsburgh, Chicago, Cleveland. 2.00c.

Worcester, Mass. 2.10c.
Birmingham 2.00c.

San Francisco 2.50c.
Galveston 2.25c.

9/32 in. to 4/64 in., \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)
20x14 in. 20x28 in.

8-lb. coating I.C... \$6.00 \$12.00
15-lb. coating I.C... 7.00 14.00
20-lb. coating I.C... 7.50 15.00
25-lb. coating I.C... 8.00 16.00
30-lb. coating I.C... 8.63 17.25
40-lb. coating I.C... 9.75 19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Standard wire nails\$2.55
Coated nails 2.55

Cut nails, carloads 3.85
Annealed fence wire\$3.05

Woven wire fence*..... 67
Fence posts (carloads)..... 69

Single loop bale ties..... 56
Galvanized barbed wire†..... 70

Twisted barbless wire 70

*15 1/2 gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and carriage bolts:

1/2 in. and smaller by 6 in. and shorter68

9/16 and 5/8 in. by 6 in. and shorter66

3/4 to 1 in. by 6 in. and shorter.64

1 1/8 in. and larger, all lengths..62

All diameters over 6 in. long..62

Lag, all sizes.....65

Plow bolts68 1/2
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:
1/2 in. and smaller.....66
9/16 to 1 in. inclusive.....63
1 1/8 in. to 1 1/2 inclusive.....61
1 3/4 in. and larger.....60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts U.S.S. S.A.E.

1/2 in. and smaller.... 66 70
9/16 to 1 in..... 63 65

1 1/8 in. through 1 1/2 in.. 61 62
1 3/4 in. and larger.... 60 ..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 72 1/2 and 10

Stove bolts in packages, with nuts attached72 1/2

Stove bolts in bulk.....82

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(1/2 in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham\$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham65 and 10

Cap and Set Screws

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller....50 and 10

Milled headless set screws, cut thread 1/4 in. and larger..... 64

3/16 in. and smaller..... 73

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller 70

Upset set screws, cup and oval points 75

Milled studs 52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Nov. 13	Nov. 14	Nov. 15	Nov. 16	Nov. 18	Nov. 19
Copper, Electrolytic ¹	12.00	12.00	12.00	12.00	12.00	12.00
Copper Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York. 50.75	50.625	50.50	50.50	50.375	50.375	50.375
Zinc, East St. Louis ²	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis ³	5.65	5.65	5.65	5.65	5.65	5.65

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct 1/4c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	51.50	54.50
Copper		
Electro	12.75	13.50
Castings	12.50	13.00
H. R. Sheets*.....	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc		
Slabs	8.50	8.10
Sheets, No. 9 casks..	12.50	14.00
Lead		
American pig	6.75	6.25
Bar	8.45	8.90
Cut sheets	8.80	9.15

Antimony
Asiatic 16.00 17.00

Aluminum
Virgin, 99% 20.00 21.00
No. 1 remelt., 98-99% 18.00 18.50

Solder
1/2 and 1/2 31.00 32.25

Babbitt
Anti-friction grade .. 23.50 21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	10.00	10.625
Hvy. and wire.....	9.00	9.40
Light and bottoms..	8.00	8.50
Brass		
Heavy	5.750	6.255
Light	4.750	5.50
No. 1 yel. turn.....	5.50	6.50
No. 1 red or compo. turnings	9.00	9.50
Hvy. Mach. compo..	9.375	9.750
Lead		
Heavy	4.75	5.25
Aluminum		
Cast	10.00	11.00
Sheet	13.00	14.00
Zinc	4.750	5.00

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cents plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 15-15.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$168-\$170 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/4; on brass sheets and rods, 40; on brass tubes, 33 1/4, and copper tubes, 40.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade 2.70c.
Delivered, Detroit 2.80c.

S.A.E. Series Numbers Alloy Differential, per 100 Lb.
2000 (1.5 Ni)\$0.35

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.) ..	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.) ..	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)...	2.60
6100 Cr-V bar	1.20

6100 Cr-V spring steel	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.
Open hearth grade3.50c.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes ..	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars ...	18.50c.	19.00c.	22.50c.	27.50c.
Plates ..	21.50c.	22.00c.	25.50c.	30.50c.
Sheets ..	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip ..	17.00c.	17.50c.	24.00c.	35.00c.
C'd st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

Base per Lb.

High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

Base per Lb.

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago ..	\$54.80
6-in. and larger, del'd New York ..	52.20
6-in. and larger, Birmingham ..	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

still perfect after year's hard use in pickling tanks of Carnegie-Illinois Steel Corp.

THESE two tanks in the plant of Carnegie-Illinois Steel Corp., Duquesne, Pa., were lined with two courses of acid-proof brick laid entirely in Penchlor Acid-Proof Cement.* They are used for pickling steel bars where the mechanical as well as the chemical action is especially severe.

Due to their large size—45' x 5' x 4'—both tanks were built with expansion joints in their lining. Inspection after a year's constant use showed absolutely no signs of permanent expansion of the lining. Both bricks and cement are still in perfect condition.

This is typical of the way Penchlor Acid-Proof Cement stands up in tough service. It is inert to all acids except hydrofluoric. It adheres strongly to such materials as brick, steel, glass, carbon, lead, and rubber. Quick-setting and self-hardening, it speeds up acid-proof construction.

For extremely abrasive conditions, or where thermal shocks are extreme, Asplit Cement* provides utmost durability and prevents spalling of bricks. It is a synthetic resin that far outlasts other types of acid-proof construction.

Pennsylvania Salt Mfg. Co., Widener Bldg., Phila., Pa.—New York • Chicago • St. Louis • Pittsburgh • Tacoma • Wyandotte.



Write for FREE TEST KIT. You can prove the outstanding properties of these acid-proof cements for yourself, and make a convincing comparison with the product you are now using, by means of the free Test Kit supplied on request. Write us today on your business letterhead.

*Fully protected by existing patents.

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals

PRICES

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless	Lap Weld,
	Cold Drawn	Hot Rolled
1 in. o.d. 13 B.W.G.	\$9.01	\$7.82
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26
1 1/2 in. o.d. 13 B.W.G.	11.70	10.23
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64
2 in. o.d. 13 B.W.G.	15.03	13.04
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50
3 1/2 in. o.d. 11 B.W.G.	28.37	24.62
4 in. o.d. 10 B.W.G.	35.20	30.54
4 1/2 in. o.d. 10 B.W.G.	43.04	37.35
5 in. o.d. 9 B.W.G.	54.01	46.87
6 in. o.d. 7 B.W.G.	82.93	71.96

Extras for less carload quantities:

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.....	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=\$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
1/8 in.	56	36
1/4 to 3/8 in.	59	43 1/2
1/2 in.	63 1/2	54
3/4 in.	66 1/2	58
1 to 3 in.	68 1/2	60 1/2

Wrought Iron

	Black	Galv.
1/4 and 3/8 in.	+9	+10
1/2 in.	24	6 1/2
3/4 in.	30	13
1 and 1 1/4 in.	34	19
1 1/2 in.	38	21 1/2
2 in.	37 1/2	21

Lap Weld

Steel		
2 in.	61	52 1/2
2 1/2 and 3 in.	64	55 1/2
3 1/2 to 6 in.	66	57 1/4
7 and 8 in.	65	55 1/2
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

Wrought Iron

2 in.	30 1/2	15
2 1/2 to 3 1/2 in.	31 1/2	17 1/2
4 in.	33 1/2	21
4 1/2 to 8 in.	32 1/2	20
9 to 12 in.	28 1/2	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
1/8 in.	54 1/2	41 1/2
1/4 to 3/8 in.	56 1/2	45 1/2
1/2 in.	61 1/2	53 1/2
3/4 in.	65 1/2	57 1/2
1 to 3 in.	67	60

Wrought Iron

1/4 and 3/8 in.	+10	+43
1/2 in.	25	9
3/4 in.	31	15
1 to 2 in.	38	22 1/2

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51 1/2
2 1/2 and 3 in.	63	55 1/2
3 1/2 to 6 in.	66 1/2	59

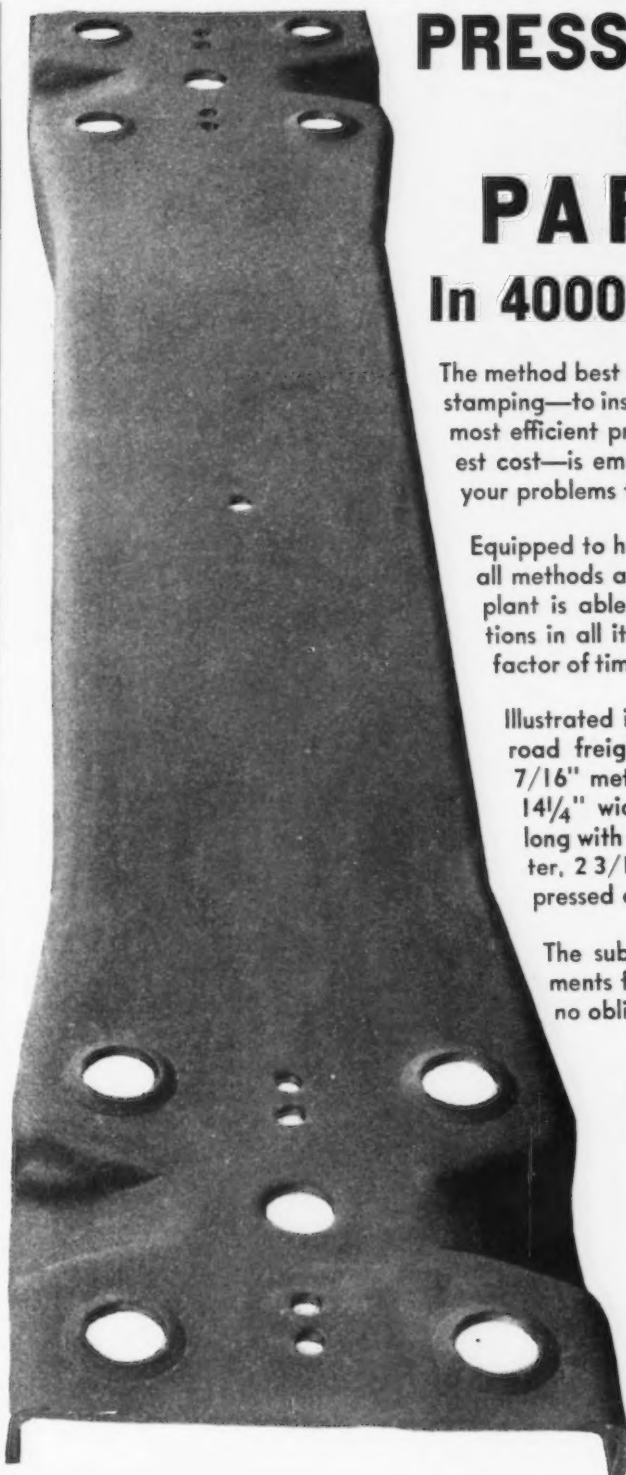
	Black	Galv.
7 and 8 in.	65 1/2	56
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

Wrought Iron

2 in.	33 1/2	18 1/2
2 1/2 to 4 in.	39	25 1/2
4 1/2 to 6 in.	37 1/2	24
7 and 8 in.	38 1/2	24 1/2
9 to 12 in.	32	20 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.



PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16 5/8" wide at ends, 14 1/4" wide at center, and 93 1/4" long with flanges 3 3/8" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

PARISH PRESSED STEEL CO.

READING, PENNA.

Pacific Coast Representative
F. Somers Peterson Co.,
57 California St.,
San Francisco, California



PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports

	<i>Per Gross Ton</i>
Old range, bessemer, 51.50% ..	\$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%	4.60
Mesaba, non-bessemer, 51.50% ..	4.45
High phosphorus, 51.50%	4.35

Foreign Ores*

C.A.F. Philadelphia or Baltimore, Exclusive or Duty

	<i>Per Unit</i>
Algerian, low P, Cu free, dry, 55 to 58% Fe	Nom.

Caucasian, washed, 52% Mn.... Nom.
African, Indian, 44 to 48% Mn.... 50c.
African, Indian, 49 to 51% Mn.... 54c.
Brazilian, 46 to 48% Mn..... 50c.
Cuban, del'd, duty free, 51% Mn.. 68c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered \$23 to \$24
Tungsten, domestic scheelite, delivered \$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade) Nom.
Rhodesian, 45% \$23.50
Rhodesian, 48% 27.50

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton \$40.00
Angle bars, 100 lb. 2.70

F.o.b. Basing Points

Light rails (from billets), gross ton \$40.00
Light rails (from rail steel), gross ton 39.00

Base per Lb.

Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast 2.30c.
Track bolts, steam railroads... 4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)... 65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.... \$20.00 to \$21.00
Domestic, f.o.b. Ohio River landing barges 20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines.. 20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid..... Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines.... 31.00
As above, in bags, f.o.b. same mines 32.60

REFRACTORIES

Fire Clay Brick Per 1000 f.o.b. Works

Super-duty brick at St. Louis.. \$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois 47.50
First quality, New Jersey.... 52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 42.75
Second quality, New Jersey.... 49.00
No. 1 Ohio 39.90
Ground fire clay, per ton..... 7.10

Silica Brick

Pennsylvania \$47.50
Chicago District 55.10
Birmingham 47.50
Silica cement, net ton (Eastern) 8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester... \$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester \$72.00
Chemically Bonded, f.o.b. Baltimore 61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)..... (*)
Domestic, f.o.b. Baltimore and Chester in sacks \$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

*None available.

Gear

TROUBLE TAKES A HOLIDAY

for 9 years

with

SUN HEAVY DUTY LUBRICANTS

Year in . . . year out . . . since 1931,
the gears and bearings on a large rolling
mill have been operating on a trouble-
free basis and are still in excellent
condition—thanks to Solnus X Heavy
Lubricating Oils. That in itself is a record . . .
but the facts prove even more!

**Plant engineers report, "this
mill has the lowest lubrication
costs of any mill in our plant."**

In your own plant . . . under your own operating condi-
tions—test the merits of these SUN Heavy Duty Lubricants.
Let them prove to you why they have set records for trouble-
free operation . . . reduced wear . . . and new lows in costs. Write

SUN OIL COMPANY, Philadelphia, Pa.

Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

PETROLEUM PRODUCTS FOR ALL INDUSTRIES

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00

Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....\$74.50*

50% (ton lots, packed)..... 87.00*

75% (carload lots, bulk).....135.00*

75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....\$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....\$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.

2% carbon17.50c.

1% carbon18.50c.

0.10% carbon20.50c.

0.06% carbon21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$113.00*

2.50% carbon 118.00*

2% carbon 123.00*

1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... \$2.00

Ferrotungsten, 100 lb. and less 2.25

Ferrovandium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots \$2.25†

Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....\$142.50

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....\$157.50

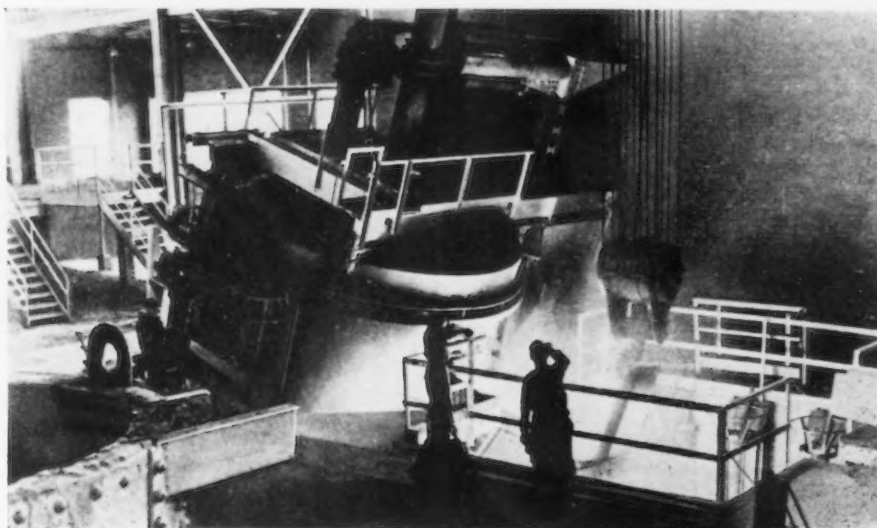
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24%, per gross tons, \$3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.4.50c.
No. 6, f.o.b. Bayonne, N. J.2.98c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.4.00c.
No. 6 industrial, del'd Cleveland.3.50c.



SWINDELL

SWINGING ROOF FURNACES

***Produce Top Quality Steel
at Lower Cost!***

The photograph shows one of a pair of 16'0" Swindell swinging-roof electric arc melting furnaces, each 35-ton capacity, at the Copperweld Steel Co., Warren, Ohio.

SWINDELL-DRESSLER CORPORATION
PITTSBURGH, PA.

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$5.00 to \$5.25
Foundry, f.o.b. Connellsville, prompt	5.50 to 5.75
F'dry, by-product, Chicago.....	10.50
F'dry, by-product, New England	13.00
Foundry, by-product, Newark or Jersey City	\$11.30 to \$11.90
F'dry, by-product, Philadelphia.	11.13
F'dry, by-product, Cleveland...	11.55
F'dry, by-product, Cincinnati...	11.00
Foundry, Birmingham	7.50
F'dry, by-product, St. Louis	
	\$10.75 to \$11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....	\$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export.	£17 18s.
Tin plate, per base box. 32s. to 33s.	
Steel bars, open hearth.	£13 9s.
Beams, open hearth....	£12 2s. 6d.
Channels, open hearth..	£12 2s. 6d.
Angles, open hearth....	£12 2s. 6d.
Black sheets, No. 24, gage	
£18 17s. 6d. max.*; £18 17s. 6d. min.**	
Galvanized sheets, No. 24	
gage £19 10s. max.*; £19 10s. min.**	

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston.....	\$24.50	\$24.00	\$25.50	\$25.00	.....
Brooklyn.....	26.50	.....	.....	27.00	.....
Jersey City.....	25.53	25.03	26.53	26.03	.....
Philadelphia.....	24.84	24.34	25.84	25.34	.....
Bethlehem, Pa.....	\$24.00	\$23.50	\$25.00	\$24.50	.....
Everett, Mass.....	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.....	24.00	23.50	25.00	24.50	.....
Steelton, Pa.....	.....	23.50	.....	.....	28.50
Birdsboro, Pa.....	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.....	24.00	23.50	.....	.....	.....
Erie, Pa.....	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.....	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.††.....	23.00	22.50	23.50	23.00	.....
Buffalo.....	23.00	22.00	24.00	23.50	28.50
Cincinnati.....	23.44	23.61	.....	24.11	.....
Canton, Ohio.....	24.39	23.89	24.89	24.39	.....
Mansfield, Ohio.....	24.94	24.44	25.44	24.94	.....
St. Louis.....	23.50	23.02	.....	.....	.....
Chicago.....	23.00	22.50	23.50	23.00	.....
Granite City, Ill.....	23.00	22.50	23.50	23.00	.....
Cleveland.....	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio.....	23.00	22.50	.....	23.00	.....
Toldeo.....	23.00	22.50	23.50	23.00	.....
Youngstown††.....	23.00	22.50	23.50	23.00	.....
Detroit.....	23.00	22.50	23.50	23.00	.....
St. Paul.....	25.63	.....	26.13	25.63	.....
Duluth.....	23.50	.....	24.00	23.50	.....
Birmingham.....	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle.....	27.50	.....	.....	.....	.....
Provo, Utah.....	22.00	.....	.....	.....	.....
Montreal†.....	27.50	27.50	.....	28.00	.....
Toronto†.....	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....\$22.50

CHARCOAL

Lake Superior fce.....\$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

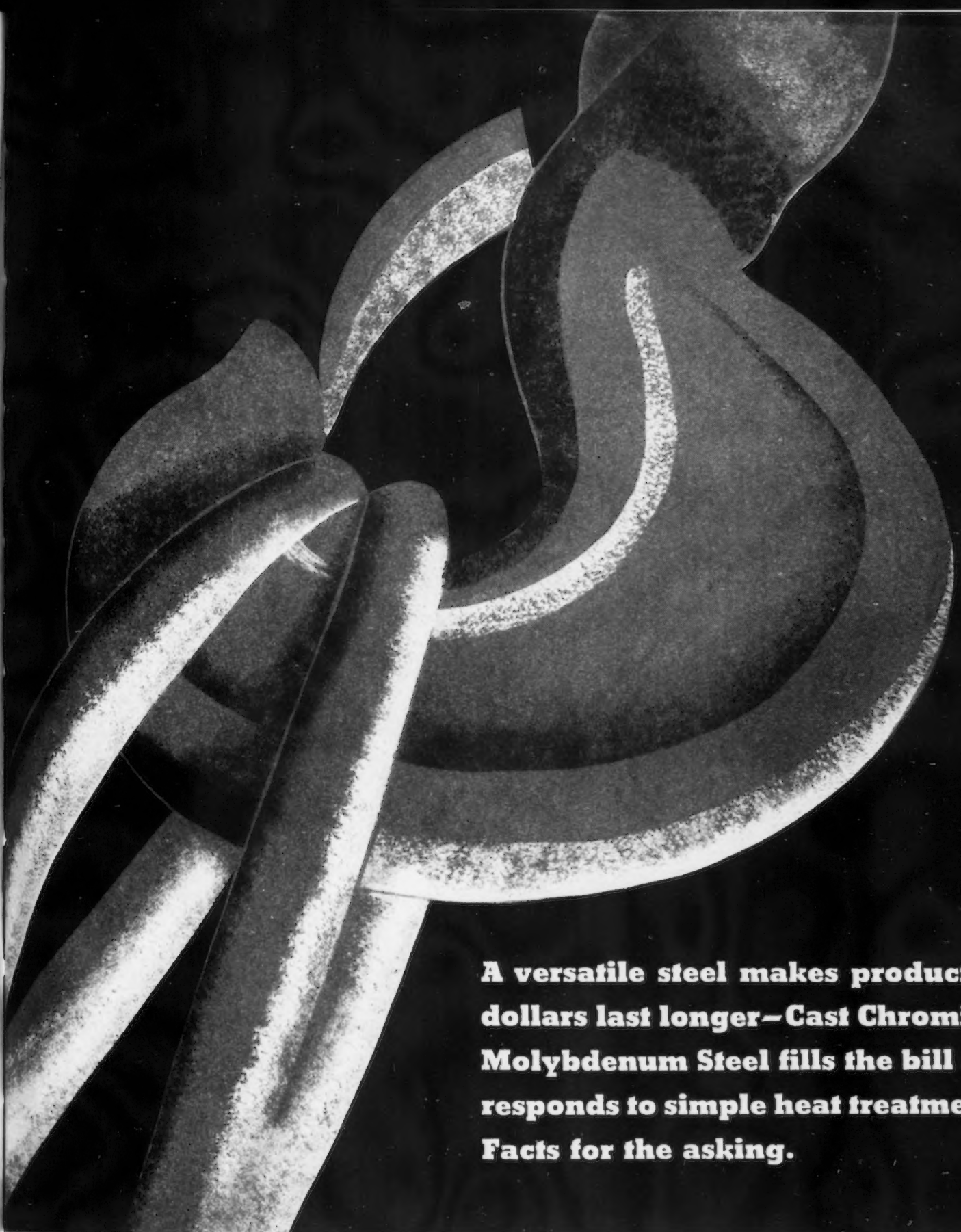
††On Oct. 25, Pittsburgh Coke & Iron Co. advanced its prices on foundry, malleable and bessemer pig iron \$1.50 a ton and on basic iron \$2 a ton at Sharpsville, Pa., and Youngstown. No change was made by this company in its Neville Island, Pa., quotations.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles
Sheets, hot rolled	\$3.15	\$3.05	\$3.15	\$3.35	\$3.38	\$3.23	\$3.05	\$3.51	\$3.45	\$3.18	\$3.30	\$3.48	\$4.30
Sheets, cold rolled .....	.....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	.....	4.12	4.35	4.43	6.50
Sheets, galvanized	4.75	4.60	4.42	4.75	4.55	4.64	4.40	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	.....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	.....	3.41	3.83	3.54	.....
Plates.....	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes.....	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished.....	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.20	7.10	7.55	7.31	7.35	7.42	7.35	7.50	.....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300.	8.15	8.15	8.15	8.56	8.59	8.45	8.40	8.63	.....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100.	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.23.

An abstract black and white graphic featuring several interlocking, thick, metallic-looking rings or bands. The bands are arranged in a complex, overlapping pattern, creating a sense of depth and mechanical strength. The lighting highlights the curved surfaces of the bands, giving them a three-dimensional appearance.

**A versatile steel makes production
dollars last longer—Cast Chromium
Molybdenum Steel fills the bill and
responds to simple heat treatments.
Facts for the asking.**

Climax Mo-lyb-den-um Company
500 Fifth Avenue • New York City

MO-LY

Sales Possibilities

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

● **Remington Arms Co.**, Bridgeport, Conn., has let general contract to Harry Maring, Jr., 536 Lindley Street, for one-story addition, 110 x 200 ft. Cost over \$100,000 with equipment.

Eastman Gelatine Corp., 217 Washington Street, Peabody, Mass., food products, has let general contract to Leslie R. Porter Co., 126 Park Street, Beverly, Mass., for one-story addition, 75 x 400 ft. Cost close to \$125,000 with equipment.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., plans large expansion for production of firearms for Army Department, for which contract has been received. Fund of \$8,074,406 will be secured from Government for purchase of additional machinery and equipment. Bids have been asked on general contract for addition to plant for office and other operating service. Cost about \$250,000 with equipment. Maxwell Moore and Charles Salisbury, 967 Farmington Avenue, West Hartford, are architects for latter structure.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 26 for seven motor-driven precision lathes (Schedule 4007), four motor-driven precision tool-room lathes (Schedule 4037) for Wickford, R. I., Quantico, Va., Jacksonville, Fla., and Corpus Christi, Tex.; 2522 shatterproof compressed gas cylinders (Schedule 4072) for Boston, Norfolk, Va., and White Plains, Md., yards.

Maxim Silencer Co., 85 Homestead Avenue, Hartford, Conn., has let general contract to Industrial Construction Co., 721 Main Street, for two-story addition, 40 x 52 ft., for production of munitions for Government. Cost about \$45,000 with equipment.

Haffenreffer & Co., Inc., 30 Germania Street, Jamaica Plain, Boston, brewer, plans steam power house for service at brewery. Cost over \$40,000 with equipment. D. D. Eames, 739 Boylston Street, Boston, is consulting engineer.

Intercontinent Aircraft Corp., Bruce D. Leighton, head of Intercontinent Corp., 30 Rockefeller Plaza, New York, airplane exports, president, recently organized, has let general contract to M. R. Harrison Construction Corp., 1605 Biscayne Boulevard, Miami, Fla., for new plant at LeJeune Road and N. W. Thirty-sixth Street, Miami, where about 100 acres has been secured. It will consist of several one-story units for parts production and assembling of all-metal monoplanes and allied aircraft for military service, with power house and other operating units. Cost about \$700,000 with equipment. Weed & Reeder, 1777 Biscayne Boulevard, Miami, are architects and engineers. William D. Pawley, 3190 Peachtree Drive, Miami, is chairman of board.

Foster-Wheeler Corp., 165 Broadway, New York, power plant and oil refinery equipment, plans one-story addition to branch plant at Dansville, N. Y., 100 x 120 ft. Cost over \$85,000 with equipment. T. R. Hugo is company engineer.

Quartermaster, Plattsburgh Barracks, Plattsburgh, N. Y., asks bids until Nov. 29 for 14,400 ft. of steel rails, splice bars, 2200 lb. of track spikes, 400 lb. of track bolts, car wheels and axles, switch points, track gage, etc. (Circular 678-20).

Silvray Lighting, Inc., 47-02 Thirty-first Place, Long Island City, incandescent lamps and other lighting equipment, has purchased former textile mill of Middlebrook Mills, Inc., Bound Brook, N. J., consisting of main two-story structure, 75 x 370 ft., and several one-story units, totaling about 82,000 sq. ft. floor space, and will remodel for plant.

New York Central Railroad Co., 466 Lex-

ington Avenue, New York, has let general contract to Metzger Construction Corp., 429 Carlton Street, Buffalo, for one-story shop at Buffalo yards, for diesel engine maintenance and inspection. Cost close to \$50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 26 for 690,000 lb. of steel welding electrodes for Brooklyn Navy Yard, 690,000 lb. for Philadelphia yard, 70,000 lb. for Boston, 780,000 lb. for Norfolk, Va.; 70,000 lb. each for Charleston, S. C., Mare Island, and Puget Sound yards (Schedule 4062).

Johns-Manville Corp., 20 East Fortieth Street, New York, fireproof building products, insulating materials, etc., plans one-story addition to branch plant at Nashua, N. H., for storage and distribution, and one-story extension to branch plant at Richmond, Ind., for similar service; also will remodel property at Zelienople, Pa., acquired a few months ago, for large production of insulating brick. Fund of \$625,000 has been authorized for entire project.

Sier-Bath Co., 640 West Fifty-eighth Street, New York, gears, sprocket wheels, etc., has let general contract to Bonanno Construction Co., 1827 Bergen Turnpike, North Bergen, N. J., for new one and two-story plant, 100 x 180 ft., on Hudson Boulevard, North Bergen. Cost close to \$85,000 with equipment. James J. Rothstein, 220 Hutton Street, Jersey City, N. J., is architect.

Dow & Co., Inc., Court and Wilkeson Streets, Buffalo, highway equipment, has asked bids on general contract for one-story addition, 100 x 160 ft., for storage and distribution. Cost over \$50,000 with equipment.

National Grinding Wheel Co., Inc., Walck Road, North Tonawanda, N. Y., abrasive products, has let general contract to Laur & Mack Contracting Co., Inc., 1400 College Avenue, Niagara Falls, N. Y., for two-story addition, about 80 x 130 ft. Cost close to \$80,000 with equipment.

National Pneumatic Co., New Brunswick Avenue and Albert Street, Rahway, N. J., door control equipment, interlocking devices, etc., is erecting one-story addition, about 60,000 sq. ft. floor space, for which general contract recently was let to Wigton-Abbott Corp., 60 East Forty-second Street, New York. Cost over \$100,000 with equipment.

Gordon Baking Co., 2303 East Vernor Street, Detroit, has acquired property, 100 x 200 ft., on Belgrave Drive, Kearny, N. J., for new factory branch, storage and distributing plant. Cost over \$60,000 with equipment.

Reading Steel Casting Co., Tulphehocken Street and Lehigh Valley Railroad, Reading, Pa., plans one-story addition, for expansion in machine shop. Cost close to \$70,000 with equipment.

York Safe & Lock Co., York, Pa., plans new plant on about 200 acres near city limits, recently acquired, for munitions for Government. It will comprise two main production units, including machining and finishing divisions, and smaller structures, with boiler house and auxiliary buildings. Cost close to \$1,600,000 with equipment.

Elliott Co., North Fourth Street, Jeannette, Pa., steam power plant equipment, has let general contract to J. E. Snyder, 122 East Pittsburgh Street, Greensburg, Pa., for one-story addition, 100 x 200 ft. Cost over \$85,000 with equipment. Prack & Prack, Martin Building, Pittsburgh, are architects.

Deissler Machine Co., Greenville, Pa., electric refrigerators and parts, has approved plans for new plant on 12-acre tract on Osgood Road, Sugar Grove Township, recently acquired, with main one-story unit, about 40 x 300 ft., and auxiliary buildings. Cost close to \$100,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for two 20-ton gasoline-electric traveling jib cranes for Puget Sound Navy Yard, Bremerton, Wash. (Specifications 10206).

Procurement Division, Veterans' Administration, Washington, asks bids until Nov. 25 for welding and cutting equipment (Circular M-220).

Baltimore & Ohio Railroad Co., Baltimore, has let general contract to George F. Hazlewood Co., Cumberland, Md., for extensions and improvements in engine house and shop facilities at Cumberland yards. Cost over \$75,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 13 for three pumping units, four supports, one bulkhead unit and three discharge pipes for dewatering service (Schedule 4508).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 26 for diesel oil fuel pumps, with spare parts, tools and wrenches (Schedule 3992), steel cable (Schedule 4000), 10 to 72 sets of propelling machinery, less diesel generating units, and 10 to 72 sets of additional such units (Schedule 3999), portable hydrogen gas indicators (Schedule 4034) for Eastern and Western yards; 250,000 lb. of admiralty metal condenser tubes (Schedule 4016) for Norfolk, Va., Mare Island and Puget Sound yards.

The South

● **Reynolds Metals Co.**, Federal Reserve Bank Building, Richmond, Va., manufacturer of aluminum and other metal foils, light parts, etc., plans new works near Macon, Ga., where tract has been acquired, for production of shell fuzes for Government. It will consist of about 10 one-story buildings, with shops, power house and auxiliary structures, for assembling, loading and other service. Cost close to \$1,000,000 with equipment. About 20 powder magazines also will be built.

Kentucky Utilities Co., Louisville, plans new steam-electric generating plant on Kentucky River, near High Bridge, installation to include turbine-generator units and accessories, with capacity of 25,000-kw., high-pressure boilers and auxiliary equipment. Company also will build additions to transmission lines for connection of eastern transmission system and connection with lines running to Louisville. Cost close to \$3,000,000.

George A. Hormel Co., 2327 First Avenue, Birmingham, canned and packed food products, has let general contract to Brice Building Co., Inc., South Eighteenth Street, for new one-story processing and packing plant, 95 x 120 ft. Cost over \$70,000 with equipment. Main offices are at Austin, Minn.

Klaene & Kruckemeyer Foundry & Engineering Co., 1320 Russell Street, Covington, Ky., is erecting one-story addition to foundry, 40 x 95 ft., for which general contract recently was let to Edward Wihers, 35 South Grand Avenue, Fort Thomas, Ky. Cost close to \$40,000 with equipment.

Tennessee Valley Authority, Knoxville, Tenn., plans new phosphate rock mining plant near Godwin, Tenn., for production of raw material for use in manufacture of commercial fertilizer at plant at Muscle Shoals, Ala. It will consist of mining plant, with units for washing, classifying, grinding, drying, loading and other operations. A sintering plant also is planned. Cost about \$1,000,000 with equipment. Department of Chemical Engineering will be in charge.

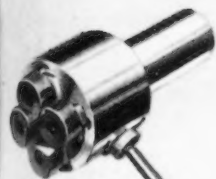
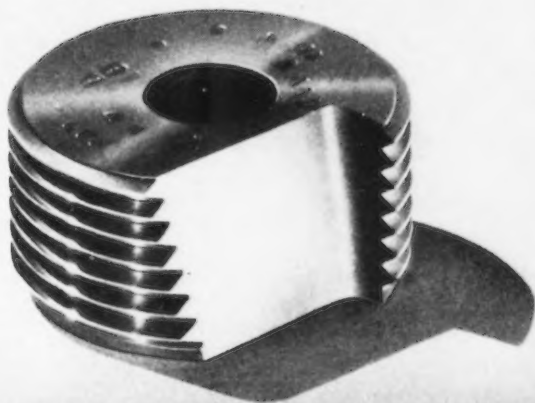
Quartermaster General, Washington, plans power house at new Army replacement camp at Macon, Ga., on site of former Camp Wheeler; also will build machine and repair

1,351,000 Pieces

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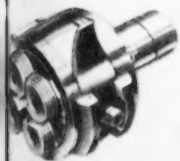


Thread cut on rough diam.
— malleable iron.



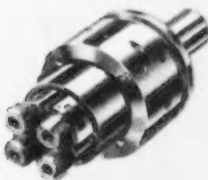
Style DS, sizes
 $\frac{3}{16}$ " - $\frac{4}{8}$ "

Style DR, sizes
.056 - $\frac{4}{8}$ "



Style DBS, sizes
.056 - $\frac{9}{16}$ "

Style RSP Tap
sizes $2\frac{1}{4}$ - 5"



Circular Chasers give 10 TIMES
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Chaser cost — 2¢ per 1,000 pieces

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Each chaser is checked before and after each grind with a micrometer fixture. You take off as little as .015" per grind. When you replace chasers in die head they are identical—ready to go. This not only eliminates scrap loss, but minimizes time loss between grinds. You can remove and replace four chasers in less than one minute.

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ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

shops, and other mechanical departments. Entire project will cost about \$5,500,000. Hentz, Adler & Shutze, and J. Warren Armistead, Candler Building, are architects; Newcombe & Boyd, Trust Co. of Georgia Building, are consulting engineers, all Atlanta.

Central States

• **Delco Products Corp.**, Division of General Motors Corp., East First Street, Dayton, Ohio, motors, starting equipment, etc., has let general contract to C. H. Shook, Inc., 582 West Second Street, for seven-story and basement addition, 90 x 240 ft. Cost over \$650,000 with equipment.

Cincinnati Milling Machine Co., Marburg Avenue and South Street, Cincinnati, plans one-story addition for expansion in machine shops. Cost close to \$200,000 with equipment.

Air Corps, Materiel Division, Contracting Officer, Wright Field, Dayton, Ohio, asks bids until Nov. 25 for quantity of wire (Circular 999).

Towmotor Co., Inc., 1226 East 152nd Street, Cleveland, gasoline-driven industrial trucks, tractors, etc., will soon begin superstructure for one and two-story addition, 45 x 150 ft., for which general contract recently was let to Peck & Udell Construction Co., 4500 Euclid Avenue. Cost over \$75,000 with equipment. C. B. Rowley & Associates, Keith Building, are architects.

Master Products Co., 6400 Park Avenue, Cleveland, washers, burrs, expansion plugs and other mechanical equipment, has let general contract to Truscon Steel Co., 6100 Truscon Avenue, for one-story addition, 60 x 135 ft., for expansion in machine shops. Cost over \$60,000 with equipment.

International Machine Tool Co., 1124 West Twenty-first Street, Indianapolis, has let general contract to William P. Jungelaus Co., 825 Massachusetts Avenue, for one-story addition, 100 x 100 ft., with extension, 50 x 75 ft. Cost close to \$90,000 with equipment.

International Steel Co., 1321 Edgar Street, Evansville, Ind., plans new two-story boiler house. Cost close to \$40,000 with boiler units and auxiliary equipment. A. R. Bergdolt, Pollack Avenue, R.R.3, Evansville, is engineer.

Sterling Aluminum Products, Inc., 2925 North Market Street, St. Louis, automobile parts and kindred equipment, will take bids soon on general contract for one-story addition, 80 x 112 ft. Cost close to \$75,000 with equipment. Edward J. Lawler, 3736 West Pine Boulevard, is architect.

Cardwell Mfg. Co., 801 South Wichita Street, Wichita, Kan., oil field winches, parts and allied equipment, plans one-story addition, 48 x 160 ft., for storage and distribution. Cost close to \$40,000 with equipment.

White Baking Co., 4015 Papin Street, St. Louis, has let general contract to Woermann Construction Co., 3800 West Pine Boulevard, for one-story and basement addition to baking plant. Cost over \$50,000 with equipment. D. A. Bohlen & Son, Majestic Building, Indianapolis, are architects. Main offices are in Merchants' Bank Building, Indianapolis.

Texas Corp., Port Arthur, Tex., plans additions to oil refineries for production of greases and allied oil by-products, comprising several one and multi-story units, with steel tank storage department and other divisions. Cost close to \$300,000 with equipment. Main offices are at 135 East Forty-second Street, New York.

North American Aviation, Inc., Inglewood, Cal., airplanes and parts, has let general contract to James Stewart & Co., Inc., 230 Park Avenue, New York, for new plant near Hensley air field, Dallas, Tex., for production of military aircraft for Government. Cost close to \$6,000,000 with equipment. Lloyd Allen and John R. Kelley, Architects' & Builders' Building, Indianapolis, are architects; Gordon Turnbull, last noted address, is consulting engineer.

Mechanical-Handling Systems, Inc., 4601 Nancy Street, Detroit, conveying and allied equipment, has let general contract to C. A. Handyside Construction Co., General Motors Building, for one-story addition. Cost close to \$40,000 with equipment.

Ethyl Gasoline Corp., 723 East Milwaukee Street, Detroit, has asked bids on general contract for three additions to technical laboratories at 7600 West Eight-Mile Road, Ferndale, near Detroit, for aeronautical research and experiments, testing building, and engineering building; also for new power plant. Cost over \$125,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., New Center Building, is architect and engineer.

Superior Metal Products Co., Auburn Heights, Mich., metal goods, plans one-story addition. Cost over \$45,000 with equipment. W. D. Knox, Pontiac, Mich., is architect.

Chrysler Corp., 341 Massachusetts Avenue, Detroit, has leased about 600,000 sq. ft. of floor space in main plant of Graham-Paige Motors Corp., 8505 West Warren Street, with sidings and docks, for production of munitions for Government. General contract has been let to O. W. Burke Co., Fisher Building, for power house at new plant in Warren Township, near Detroit, for construction of Army tank cars. Albert Kahn Associated Architects & Engineers, Inc., New Center Building, is architect and engineer.

Diamond T Motor Car Co., 4517 South Twenty-sixth Street, Chicago, will soon begin superstructure for one-story addition, 120 x 400 ft., for storage and distribution. J. W. Snyder Construction Co., 307 North Michigan Avenue, is general contractor. Cost close to \$100,000 with equipment. Armstrong, Furst & Tilton, 11 South LaSalle Street, are architects.

W. F. & John Barnes Co., South Water Street, Rockford, Ill., lathes and other tools and parts, has let contract to Austin Co., Cleveland, for one-story addition, about 170 x 215 ft. Three crane runways will be installed. Cost over \$100,000 with equipment.

Handy Button Machine Co., 540 North Western Avenue, Chicago, machinery and parts, plans new one-story and basement plant at Rockwell and Twenty-third Streets. Cost over \$100,000 with equipment. A. Epstein, 2001 West Pershing Road, is engineer.

Ameco Metal, Inc., 3830 West Burnham Street, Milwaukee, metal products, has let general contract to Keierleber Construction Co., 4709 West Lisbon Avenue, for one-story addition, 50 x 150 ft. Cost close to \$50,000 with equipment.

Flour City Ornamental Iron Co., 2637 Twenty-seventh Avenue South, Minneapolis, Minn., has leased one-story building to be erected at Twenty-seventh Avenue and Twenty-seventh Street, by Northwest Marble Corp., last noted location, for expansion. Erection contract has been let to Jensen Construction Co., National Bank Building. Cost over \$50,000 with equipment. Larson & McLaren, Foshay Tower Building, are architects.

Rath Packing Co., 1600 Sycamore Street, Waterloo, Iowa, meat packer, will take bids soon on general contract for three-story addition. Cost over \$80,000 with equipment. Henschien, Everds & Crombie, 59 East Van Buren Street, Chicago, are architects and engineers.

Dearborn Chemical Co., 310 South Michigan Avenue, Chicago, industrial chemicals, has let general contract to Dahl-Stedman Co., 11 South LaSalle Street, for two-story addition to plant at 1029 West Thirty-fifth Street. Cost over \$60,000 with equipment. J. L. Fyfe, 316 South Euclid Avenue, Oak Park, Ill., is architect.

Webster Electric Co., Clark and DeKoven Avenues, Racine, Wis., transformers, public address systems and other electrical apparatus, has asked bids on general contract for two two-story additions, 60 x 117 ft. and 60 x 100 ft. Cost close to \$100,000 with equipment. N. Ronneberg Co., 5050 Grand Avenue, Chicago, is architect; Frank J. Hoffman, 201 Sixth Street, Racine, is supervising architect.

Western States

• **Mission Water Heater Co.**, 7101 McKinley Avenue, Los Angeles, hot water heaters, parts, etc., has asked bids on general contract for new one-story plant, 50 x 200 ft., at 7102-6 Stanford Avenue. Cost close to \$75,000 with equipment. A. Godfrey Bailey, 1308 Fourth Avenue, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 26 for 42,500 lb. of admiralty metal condenser tubes (Schedule 4050) for Puget Sound Navy Yard, Wash.; 20,000 pneumatic tool chisel blanks and 96 pneumatic tool chisels (Schedule 3998), 2700 electric storage battery elements (Schedule 4010); until Nov. 28, one motor-driven bolt-threading machine (Schedule 4056) for Mare Island yard.

Pacific Can Co., 290 Division Street, San Francisco, has acquired tract, about 275 x 450 ft., at Modesto, Cal., for new plant, consisting of main one-story unit and smaller structures. Cost over \$150,000 with equipment.

Unified School District, Burbank, Cal., has low bid from Harry F. Miller, 7530 South Hobart Boulevard, Los Angeles, at \$108,593 for construction, exclusive of equipment, of two-story industrial arts building at Burbank Senior High School, about 30,000 sq. ft. floor space. Equipment will be purchased under separate contracts. John C. Austin, Chamber of Commerce Building, Los Angeles, is architect.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Nov. 27 for one-story transit shed, 39,300 sq. ft. floor space; one-story shop building, locomotive and crane shed, and other mechanical structures at Naval Supply Depot, Oakland, Cal. (Specification 10111).

Rohr Aircraft Corp., Eighth and J Streets, Chula Vista, Cal., airplanes and parts, plans one-story factory for parts production and assembling. Cost about \$80,000 with equipment.

Procurement Office, Bonneville Project, Department of Interior, Guardian Building, Portland, asks bids until Nov. 25 for steel towers for new transmission line from Grand Coulee, Wash., to Covington, Wash., 183 miles, requiring 898 tower units, with leg extensions, anchors, stubs, special structures, etc. (Circular 1522).

Canada

• **Bowers Machine Co., Ltd.**, 275 St. James Street West, Montreal, machinery and parts, plans one-story addition for foundry unit, for production of iron and other castings. Cost close to \$55,000 with equipment.

Canadian Industries, Ltd., Montreal, Plastics Division, has taken over buildings of parent company at Brownsburg, Que., for production of synthetic fiber (nylon) specialties. Production is scheduled to begin in January. Cost over \$100,000 with equipment.

Blue Top Brewing Co., King Street West, Kitchener, Ont., has begun work on two-story addition, 35 x 100 ft., for which general contract recently was let to E. & E. Segmiller, 1228 King Street East. Cost close to \$100,000 with equipment.

MacDonald Brothers Aircraft, Ltd., 50 Robinson Street, Winnipeg, Man., airplanes and parts, has let general contract to Bird Construction Co., Ltd., Confederation Life Building, for two-story and basement addition. Cost close to \$65,000 with equipment.

Ontario Hydro Electric Power Commission, University Avenue, Toronto, has received approval to proceed with hydroelectric power developments in Ontario at a cost of \$12,000,000. Projects include physical works for Ogoki diversion costing about \$5,000,000 and a 54,000-hp. plant on Madawaska River to cost \$7,000,000.

Industrial Glass Co., Ltd., Ouimet Avenue, St. Laurent, Que., will start work immediately on plant addition, 120 x 150 ft., to cost about \$500,000 with equipment. Alexis Nihon is owner. Dominion Bridge Co., Lachine, Que., has structural steel contract. Furnace building also is planned.

Department of Public Works, Ottawa, J. M. Somerville, secretary, has let contract to Angus Robertson, Ltd., 660 St. Catharine Street West, Montreal, for addition to H.M.C. Dockyard at Halifax, N. S., to cost \$138,300.

Page Hersey Tubes, Ltd., Church Street, Toronto, has let general contract to Dickie Construction Co., Ltd., 17 Yorkville Avenue, Toronto, for addition to plant near Welland, Ont. Cost, with equipment, about \$75,000.